DOCUMENT RESUME

ED 252 871 CS 208 741

AUTHOR	Kelley, Patrick M., Ed.; And Others
TITLE	The Council for Programs in Technical and Scientific Communication Proceedings (10th, Lincoln, Nebraska, April 7-8, 1983).
INSTITUTION	Council for Programs in Technical and Scientific Communication.
PUB DATE	Apr 83
NOTE	138p.; For 1974-1984 conference proceedings, see ED 132 630, CS 208 733 and CS 208 735-742.
AVAILABLE FROM	Patrick M. Kelley, Clark College, 1800 East McLoughlin Blvd., Vancouver, WA 98663 ($7.50, including postage, while supply lasts).
PUB TYPE	Collected Works - Conference Proceedings (021) -- Reports - Descriptive (141) -- Viewpoints (120)
EDRS PRICE	MF01/PC06 Plus Postage.
DESCRIPTORS	*Education Work Relationship; Graduate Study; Higher Education; *Internship Programs; *Program Content; Program Descriptions; Teaching Methods; *Technical Writing; Undergraduate Study; Writing Instruction
IDENTIFIERS	*Writing Programs

ABSTRACT

Articles in these proceedings of a conference of the Council for Programs in Technical and Scientific Communication represent the views of professional communicators and academicians who share a concern for providing breadth and quality of preparation for present and future technical communicators. The 10 papers discuss the following topics: (1) changes and modifications in the technical writing program at Oklahoma State University, (2) the technical writing internship program at Oklahoma State University, (3) designing a professional technical communication degree program, (4) undergraduate and graduate programs in technical writing at Penn State University, (5) technical writing internships at Eastern Washington University, (6) a two-year progress report on the technical writing program at Case Western Reserve University, (7) teaching problem-solving strategies in the technical communication classroom, (8) the communication minor program for engineering and science students at the University of Missouri-Rolla, (9) planning a technical writing program at Kansas Technical Institute, and (10) a contemplative view of technical writing. Minutes from the Council's annual business meeting, the conference program, and a list of Council members are included. (HTH)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED252871

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☒ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
● Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

Proceedings
1983

University of Nebraska
Lincoln, Nebraska

The Council for Programs in Technical and Scientific Communication

CS 208 741

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
Patrick M. Kelley
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

PROCEEDINGS 1983

of

The Council for Programs in Technical and Scientific Communication

Tenth Annual Meeting
University of Nebraska
Lincoln, Nebraska
7-8 April 1983

Editor
Patrick M. Kelley

Associate Editors
Roger E. Masse
Barbara Y. Myers
Louise M. Vest

The papers in these proceedings were reproduced from originals that were provided by the authors. The opinions in the papers are the responsibility of the authors, not of the Council for Programs in Technical and Scientific Communication.

Any paper may be reproduced without the permission of the Council for Programs in Technical and Scientific Communication if the author and the Council are credited appropriately.

Additional copies of these proceedings are available in limited numbers at $7.50, including postage. Please request copies from the editor at the Department of English / New Mexico State University / Box 3E / Las Cruces, NM 88003 / (505) 646-3931. Make checks payable to CPTSC.

Cover

by

Harold Kokes

Graphics

by

Martha J. Delamater and Roger E. Masse

Printing, Duplicating, and Binding

by

Bernie Carrillo and Anibal Cruz
Printing and Duplicating Center
New Mexico State University
Las Cruces, New Mexico

PREFACE

Included in Proceedings 1983 of the Council for Programs in Technical and Scientific Communication are a message from the President, Virginia Alm Book; the program for the Tenth Annual Meeting of the Council at the Nebraska Center of the University of Nebraska at Lincoln on 7-8 April 1983; ten papers from the program; a record of the annual business meeting with a list of the participants and guests, the Secretary's minutes for 1983, and the Treasurer's report for 1982-83; and, as appendices, the Constitution of the Council, a list of the annual meetings of the Council with the sites and the dates, a chart that literally puts the Council on the map, and a directory of the current members of the Council.

Each of the ten papers in these proceedings is interesting in itself. Read each of the papers. Read all of the papers. When all of the ten papers are read, the whole is even more interesting than the sum of the parts. Reading all of the papers together in one or two sittings is like experiencing good conversation. In other words, it is like experiencing an annual meeting of the Council.

On behalf of the Council, I thank Virginia Book for hosting--so graciously--our meeting at the University of Nebraska, where we were welcomed not only by Virginia and her husband, Albert, but also by the Head of the Department of Agricultural Communications, Richard Fleming; the Dean of the College of Agriculture, T. E. Hartung; the Mayor of Lincoln, Helen G. Boosalis; and the Governor of Nebraska, Robert Kerrey. I also thank Virginia's co-hosts and her colleagues in the Department of Agricultural Communications, Laura E. Casari and Gerald Parsons. To thank Virginia, Laura, and Jerry appropriately, I dedicate these proceedings to them.

On my own behalf, I thank my graphic artist, Martha J. Delamater, for creating her quill pen from my turkey feather and her president's gavel from my carpenter's hammer. And, finally, I thank my associate editors--Roger E. Masse, Barbara Y. Myers, and Louise M. Vest--for assisting me in editing these proceedings. We present Proceedings 1983 for the approval of the Council.

Patrick M. Kelley

Patrick M. Kelley
Vice President and Editor

TABLE OF CONTENTS

FROM THE PRESIDENT vii

PROGRAM x

PAPERS 1

The Technical Writing Program at Oklahoma State University: Changes and Modifications 2
Thomas L. Warren, Oklahoma State University

The Internship Program at Oklahoma State University 10
Sherry G. Southard, Oklahoma State University

Engineering a Professional Technical Communication Degree 18
Victoria M. Winkler, University of Minnesota

Undergraduate and Graduate Programs in Technical Writing at Penn State 29
Jack Selzer, Pennsylvania State University

Technical Writing Internships at Eastern Washington University 45
Judith Kaufman, Eastern Washington University

A Two-Year Progress Report on the Technical Writing Program at Case Western Reserve University: What's New on Euclid Avenue? 50
Marilyn Schauer Samuels, Case Western Reserve University

Teaching Problem-Solving Strategies in the Technical Communication Classroom 56
JoAnn T. Hackos, University of Colorado at Denver

"Breadth and Depth" for Engineering and Science Students: The Communication Minor at the University of Missouri-Rolla 71
Sam C. Geonetta, University of Missouri-Rolla

Planning a Technical Writing Program at Kansas Technical Institute 81
Dale Sullivan, Kansas Technical Institute

A Contemplative View of Technical Writing 85
Carol Lipson, Syracuse University

ANNUAL BUSINESS MEETING 105

Participants and Guests in 1983 106

Secretary's Minutes for 1983 108

Treasurer's Report for 1982-83 111

7

APPENDICES 113

Appendix A: Constitution (As Amended 1981) 114

Appendix B: Annual Meetings, Sites, and Dates 118

Appendix C: Executive Committee and Institutions Represented by Current Members 119

Appendix D: Current Members 120

FROM THE PRESIDENT

In 1973, Thomas E. Pearsall (University of Minnesota) sent letters to directors of technical communication programs at twenty schools. He suggested that, because of common interests and concerns, it might be useful to meet. In the spring of 1974, nine directors, nine professors from the University of Minnesota, and two representatives from the Twin Cities Chapter of the Society for Technical Communication met in St. Paul The participants' enthusiasm resulted in a second meeting in 1975, at Boston University. In 1976, the group, convinced of the value of such meetings, adopted the name Council for Programs in Technical and Scientific Communication. In 1977, CPTSC became an officially recognized organization when it adopted a constitution and by-laws. CPTSC now has approximately seventy-nine members who represent thirty states from every region in the United States.

The focus for CPTSC has remained constant: to exchange information, generate ideas, support research, and encourage quality in technical communication programs. To improve our information network we have published our proceedings and a directory of programs. Plans for bringing the directory up to date are now under way. We have reviewed our constitution, and, where necessary, we have amended it to describe our procedures more accurately. The fact that the adjustments are minor reflects the acumen and foresight of those who wrote it. We are indebted to them. This year we have taken a major step to establish archives at the University of Minnesota. It seems appropriate that Tom Pearsall should oversee the records of our development, and he has graciously agreed to do so.

The strength of the organization emanates from the willingness of the members to discuss issues openly and to offer support to each other. This cooperative spirit has never been better demonstrated than at our most recent meeting in Lincoln.

The seventeen participants came from every region of the United States, except the Southeast, and represented fifteen colleges and universities. Five guests joined us. Some who had registered for the meeting had to cancel because of last minute budget constraints, a problem with which we are all increasingly familiar. Still, we had fine representation.

Guided by this year's theme "The Second Decade: Review and Evaluation of Programs in Technical and Scientific Communication," presenters from established programs enlightened us about their review processes and the modifications that have resulted from them. We also heard about recently initiated programs. New members brought specific problems with which they needed help. They were impressed and gratified by the many suggestions offered. By any measure, the presentations were outstanding.

One reason these meetings are unique is because of the successful blend of substantive, practical information with stimulating, intellectual inquiry. We hear practical suggestions for gaining visibility and credibility in our departments, schools and communities, for developing budgets, working with administrators, evaluating faculty credentials, incorporating technology, and so on. We discuss the advisability of expanding course offerings before developing a program, or vice versa. But, inevitably, we also discuss and debate traditional and current theories and their relationships to technical communication. Because we are a small group, there is time to question and probe the theoretical bases, rationales, and justifications for content, courses, and programs.

What makes it all work so satisfactorily, of course, is the people; there is a generosity of spirit, both professional and personal. Whatever the philosophical differences, or the personal idiosyncrasies, an aura of warmth and respect is generated by this group that is rare indeed.

In Lincoln, we worked hard; we learned a great deal; we relaxed and enjoyed one another's company. We look forward with great anticipation to our next meeting at New Mexico State University in Las Cruces. Join us. You will not be disappointed.

Virginia Alm Book
Virginia Alm Book
President

PROGRAM

Tenth Annual Meeting
of
The Council for Programs in Technical and Scientific Communication

University of Nebraska
Lincoln, Nebraska
7-8 April 1983

Thursday, 7 April

7:00-8:00 Breakfast in the Grand Island Room

9:15 Welcome by Richard Fleming, Head of the Department of Agricultural Communications, University of Nebraska

Welcome by T. E. Hartung, Dean of the College of Agriculture, University of Nebraska

9:45 Introductions and Announcements
Virginia Alm Book, University of Nebraska

10:00 "The M.A. in Professional Writing and the Ph.D. in Rhetoric at Carnegie-Mellon University"

Beekman W. Cottrell, Carnegie-Mellon University

10:30 Break

10:45 "The Technical Writing Program at OSU: Changes and Modifications"

Thomas L. Warren, Oklahoma State University

11:15 "The Internship Program at Oklahoma State University"

Sherry G. Southard, Oklahoma State University

11:45 Break for Lunch

12:00 Lunch in the Grand Island Room

1:30 "Engineering a Professional Technical Communication Degree"

Victoria M. Winkler, University of Minnesota

2:00 "Undergraduate and Graduate Programs in Technical Writing at Penn State"

Jack Selzer, Pennsylvania State University

2:30 "Technical Writing Internships at EWU"

Judith Kaufman, Eastern Washington University

3:00	Break
3:15	Open Discussion of Programs and Curricula
4:00	Adjournment
6:15	Wine and Cheese in the Grand Island Room
7:00	Dinner in the Grand Island Room

Friday, 8 April

7:00-8:00	Breakfast in the Grand Island Room
9:00	Annual Business Meeting
10:30	Break
10:45	"A Two-Year Progress Report on the Technical Writing Program at CWRU: What's New on Euclid Avenue?" Marilyn Schauer Samuels, Case Western Reserve University
11:15	"Teaching Problem-Solving Strategies in the Technical Communication Classroom" JoAnn T. Hackos, University of Colorado at Denver
11:45	Break for Lunch
12:00	Lunch in the Grand Island Room
1:30	"'Breadth and Depth' for Engineering and Science Students: The Communication Minor at the University of Missouri-Rolla" Sam C. Geonetta, University of Missouri-Rolla
2:00	"Planning a Technical Writing Program at KTI" Dale Sullivan, Kansas Technical Institute
2:30	"A Contemplative View of Technical Writing" Carol Lipson, Syracuse University
3:00	Break
3:15	"Update on the Technical Communication Program at RIT ('If You Gotta Go, Start Early')" Andrea Corcoran Walter, Rochester Institute of Technology
3:30	Open Discussion of Programs and Curricula
4:00	Adjournment

PAPERS

THE TECHNICAL WRITING PROGRAM AT O.S.U.: CHANGES AND MODIFICATIONS

THOMAS L. WARREN
DIRECTOR, TECHNICAL WRITING PROGRAM
OKLAHOMA STATE UNIVERSITY

I want to keep the preliminary remarks to a minimum and move to the changes that we have made at Oklahoma State University in our Technical Writing Program. I have already spoken about the Program (see the 1981 Proceedings to CPTSC), describing the process we went through to establish the option (our degree is the B.A. in English with a Technical Writing option).

We currently have some 25 undergraduates who are either majoring or minoring in technical writing. I am hesitant because the students often will minor in English (Technical Writing option) and not let anyone know. I am certain, however, that we have 10 graduate students studying technical writing. These students are working within the framework of our M.A. or Ph.D. in English, using technical writing topics for their examinations and thesis/dissertation projects. They also take classes in technical writing as part of their plans of study and teach technical writing to sophomores and juniors. In short, both programs are healthy, and with the move to add an official option in technical writing to the M.A. in English, we should have an even larger program when I report to you next year.

I want to spend the bulk of my time describing changes in the 10 courses that we offer (I will use short titles for them):

ENGL 2333. Introduction to Technical Writing. (3 semester credits. Sophomore level. No prerequisites other than 2 courses in freshman composition.)

This course and the other service course (3323) continue to grow at an unusual rate (10-12% per year). We currently offer 10 sections of 2333 each semester and they fill three weeks after enrollment starts. Students taking accounting and agricultural economics make up the majority of the students. The changes that we have made involve textbook selection (see appendix) and establishing a common syllabus. I have both textbook selection and syllabus committees for this course, and they recommend changes to me. Content remains fairly consistent year after year.

ENGL 3323. Intermediate Technical Writing. (3 credits. Junior level. Must have 60 hours including 2 courses freshman composition. Students who make an "A" or "B" in their first freshman compostition course, have permission of their college, and are a junior may substitute 3323 for the second freshman composition course.)

This course is a service course for students in engineering, science, business, home economics, etc. It is essentially unchanged except for an enlarged syllabus. I have advisory committees for textbook selection and syllabus modification for this course as well. (I might also mention that I have a fifth committee advising me: A quality control committee that looks at the overall quality of the program and makes recommendations.) We offer some 15 sections per semester.

These two courses are service courses. The remaining courses are taken by majors, minors, and those wanting additional training in writing.

ENGL 3273. Criticism: Technical Writing. (3 credits. Junior level. No prerequisites other than 2 courses in freshman composition.)

We are not sure just what this course is. It is part of the curriculum to satisfy a departmental requirement for a junior level criticism course. Students majoring/minoring in technical writing are to take it instead of 2333. So far, we have not taught it (the students take 2333 instead).

ENGL 4523. Internship. (3 credits. Senior level. Prerequisites: ENGL 3323.)

Sherry will talk about this course shortly. She is in charge of it and has made a number of changes.

ENGL 4533. Advanced Technical Writing. (3 credits. Senior level. Prerequisites: ENGL 3323.)

In the past, this course was a catch-all for odds and ends that the student had not studied somewhere else. With Sherry in the department and teaching in the Program, we can coordinate the courses and establish links among them, producing a natural sequence. In the future, the advanced course will cover all types of manuals and formal proposals. When I teach this course, I use the race car set manual project (students produce a full set of manuals for a slot racing set).

ENGL 4543. Technical and Scientific Editing (3 credits. Senior level. Prerequisites: ENGL 3323.)

This course has evolved into 65% production editing and 35% copy editing. The students do a camera-ready project of some kind (the type varies depending on who teaches it). We use guest speakers from Tulsa, Oklahoma City, and the University who describe their duties as technical editors. We have to be very careful to not overlap with the journalism editing courses, and I think we do a good job of that.

ENGL 4550. Research Problems in Technical Writing. (1-6 credits.
Senior level. Prerequisites: ENGL 3323.)

Sherry and I each offer a section of 4550 each semester including summer. We want this to be a pure research course--perhaps leading to a thesis or extended work. We want the students to use an independent study number if they want to do another manual or newsletter or brochure. If, for example, they want to look at readability as it applies to certain materials, we encourage them to use 4550.

ENGL 4563. Scientific and Technical Literature. (3 credits.
Senior level. Prerequisites: None.)

This course covers the history and development of scientific and technical literature from the Greeks to today. In practice, the course is one of stylistics and rhetoric and ends in the 19th century.

ENGL 5223 (was 5283). Teaching Technical Writing. (3 credits.
Graduate level. Prerequisites: Graduate standing.)

This course is essentially an introduction to the theory and practice of technical writing for those who want to teach the subject. All teaching assistants who teach in the Technical Writing Program must take this course. I am also getting students from the Teaching English as a Second Language program. I ask the students to do three papers and 10 abstracts (of articles on teaching technical writing). Paper 1 is a definition of technical writing; paper 2 describes a research "hole" they have found; and paper 3 is a full-scale proposal for a course in technical writing for a school that does not have one. I also assign them to experienced teachers as assistants.

ENGL 5273 (was 5290). Seminar in Technical Writing for Publication. (3 credits. Graduate level. Prerequisites: Graduate Standing.)

This course has been the surprise for us. I am finding graduate students from all colleges enroll. They are usually ready to start their thesis/dissertation projects--and want help in improving their writing. I use the writing for publication as a catch-all title to allow them to do individual projects, but I spend a lot of time working on style and organization. Students come from Home Economics, Geography, Animal Science, and other science-engineering graduate programs. I do not let English majors in, although I did make an exception with Bill Coggin and Gary Poffenbarger--both of whom were technical writing emphasis graduate students.

Those are the courses we presently offer. The future offerings will depend on the new masters program that I have summarized below.

We want to institute an option for the M.A. in English that allows a student to train at the graduate level for a career as a technical writer. If the person wants to teach technical writing, the present M.A. and Ph.D. programs are adequate. We will require 30 post-bachelor degree hours for the new option as the current requirements for an M.A. in English. Following it should make it easier for us to get our option in place by Fall, 1984.

Specifically, the student will take Introduction to Graduate Studies, the same course as all incoming M.A. people will take. I have assurances from the teachers that technical writing students can do projects directly related to technical writing. If, for some reason, that proves difficult, we will design a course for the technical writing people that follows the present course. The student will also take the Seminar in Technical Writing for Publication, a 6 credit internship, and write a thesis (6 hours). The remaining 12 hours come from electives: English, 6 hours; psychology, 3 hours; business, 3 hours.

We will make two assumptions about incoming students: (1) They have a solid background in a technical area (possibly the equivalent of a minor) and (2) they have competencies in technical writing. If the student is deficient in one or both, we will ask that they take additional courses.

At this point, we are not certain about employment--at least we have no firm data. Conversations with various publication managers suggest that these students should be in demand. We anticipate a number of the students coming from area businesses and state agencies, taking leaves or working on the degree parttime. We suspect that our initial enrollment should range from 5-8 students. More on both of these points next year.

In summary, then, I believe that our program is alive and well, thanks to a hard-working staff and the belief of my department head in the program. Oklahoma is just now entering the financial shortfall catastrophe that most of you have been experiencing for years. I think that we are on solid ground and that the Dean will not cut the program.

APPENDIX
LISTING OF TEXTBOOKS AND SUPPLIES FOR THE COURSES

ENGL 2333	Lannon. Technical Writing, 2nd. ed.
	Warren. Technical Communication, An Outline.
	Syllabus for 2333
ENGL 3323	Houp/Pearsall. Reporting Technical Information, 4th ed.
	Brusaw, and others. Handbook of Technical Writing, 2nd ed.
	Syllabus for 3323
ENGL 3273	Kirkman. Good Style for Scientific and Engineering Writing.
	Pickett/Laster. Technical English: Writing, Reading, Speaking, 4th ed.
ENGL 4523	Words into Type, 3rd ed.
	McGregor. Graphics Simplified: How to Plan and Prepare Effective Graphs, Illustrations, and Other Visual Aids.
	Pocket Pal, 12th ed.
ENGL 4533	Firman. An Introduction to Technical Publishing.
	Holtz/Schmidt. The Winning Proposal: How to Write It.
ENGL 4543	Words into Type, 3rd ed.
	Pocket Pal, 12th ed.
ENGL 4550	Williams. Style: 10 Lessons in Clarity and Grace.
ENGL 4563	Gordon. The Movement of English Prose.
	Corbett. Classical Rhetoric for the Modern Student, 2nd ed.
	Readings from various sources

ENGL 5223 Cunningham/Estrin, eds. *The Teaching of Technical Writing*.

Pearsall. *Teaching Technical Writing*.

Sawyer, ed. *Technical and Professional Communication:*. . .

Balachandran. *Technical Writing: A Bibliography*.

Materials for 5283. (English Department)

Materials for Teachers of Technical Writing. (English Department)

ENGL 5273 Day. *How to Write and Publish a Scientific Paper*.

Brusaw and others. *Handbook of Technical Writing*, 2nd ed.

OPTIONAL:

Pixton. *Some Conventions of Standard Written English*, 3rd ed.

Williams. *Style: 10 Lessons in Clarity and Grace*.

Style manual in discipline.

THE INTERNSHIP PROGRAM AT OKLAHOMA STATE UNIVERSITY

DR. SHERRY G. SOUTHARD
ASSISTANT PROFESSOR OF TECHNICAL WRITING
OKLAHOMA STATE UNIVERSITY

An Internship in Technical Communications offers students an opportunity to apply the principles of technical communication learned in the classroom to an on-the-job situtation. English 4523, Internship in Technical Writing, at Oklahoma State University is a 3-credit-hour course that is offered during the fall and spring semesters and during the summer session. Most of the time the students are not paid, and usually they complete projects for the employers rather than work a specified number of hours weekly. The employers include university faculty and administrators; persons in business, industry, and government; and others in the surrounding community. The course is a junior/senior level one that graduate students can take.

Initial Program

Dr. Tom Warren, Director of Technical Writing, began the internship in 1977 when he came to OSU. The prerequisites were and still are 9 hours of English and English 3323, Intermediate Technical/Professional Report Writing. The course included 8 weeks in the classroom when he taught items not normally covered in the preceding classes, or covered only slightly (for example, audience analysis, editing and style, and graphics) and 8 weeks on the job. Each part, the classroom work and the on-the-job work, involved approximately 60 hours of work or a total of 120 hours.

Revision of the Program

I began supervising the program in the Fall of 1981. (See Appendix I for a list of the forms I use to administer the program.) I have adapted the program established by Dr. Warren so that I determine the requirements for students according to their backgrounds (both work and academic experience). I assume, like Dr. Warren did, that the internship should involve approximately 120 hours (6 to 9 hours per week minimum for a 3-credit-hour course: 3 hours in the classroom with 3 to 6 hours outside the classroom).

Although the program is flexible and students may take the internship any time after they have completed the intermediate technical writing course, I have them take the course after they have completed English 4533, Advanced Technical/Professional Writing, and English 4543, Technical and Scientific Editing. Then they have less academic work to do, and they can spend more time on the job. Also by that time they have improved their writing skills and I don't have to help them so much with their projects.

An internship program can still be established in schools offering only introductory or intermediate technical writing courses; it is not necessary that the school offer a technical writing minor or major. An effective internship program depends upon the director and students finding projects that the students can complete successfully with their particular backgrounds and some independently directed academic work.

The Internship Project Selected. I have a file of internship vacacies, but I find that the internship is most satisfactory when students do most of the work to find their own projects and employers. Usually, though, the students and I work together. They suggest possible ideas for the internship and I make suggestions. I consider the suggested projects in terms of students' academic and work experiences. We find the project or projects that I estimate will take the number of hours the students will spend on the job.

The Academic Work Required. When the students and I have determined who their employers will be and what their project(s) will be, I then assign any academic work needed for them to be able to complete their internship successfully. For instance, students who are writing manuals, but who have not had the advanced technical writing course in which students learn how to write manuals, have to prepare an annotated bibliography for that subject. Students who have not had much theory about audience analysis do additional preparation in that area. If students will need to prepare graphics for their projects, then I assign them the necessary work.

In addition to the academic "modules" assigned, students complete the following items:

°whatever is necessary for them to apply for the position with their employers (for example, submit job application letters and resumes, have an interview, or complete "contracts")

°progress report(s)

°a final report

°a log book for all academic and on-the-job work which includes the date, the time worked, a description of duties, and comments*

Employers' Evaluations. The employers evaluate the interns twice. I ask employers to contact me if there are any problems or if they have any questions. I receive progress reports from the students and I check on what they are doing; for instance, the students must let me see what they have done before they submit final projects to their employers. For the most part, though, I try to let students and employers work together without my interfering. I tell employers to treat students as they would if the students were paid employees.

The Hours Required. As I indicated earlier, students should put in a total of 120 hours for both the academic and on-the-job work. I don't want to penalize good students who work fast or to not require as much as I should of weak students who take longer; therefore, I allow the range to be 110 hours to 130 hours. If students' projects take them much less than the 110 hours, then I assign additional work. If the students' projects take more than 130 hours, I give them additional credit. I stress to students that they must complete the internship since the internship program involves employers. What students do in the course reflects not just on them but on our program. If they don't finish their projects or do unsatisfactory work, then they have hurt our entire internship program.

---

*The comments section includes matters such as problems encountered, academic training or work experience that the students have had that is helpful, techniques they discover that make the work they are doing easier, differences in the work for their projects and the work that they do as students, and a procedure they might revise and the way they would revise it.

Description of Projects. As was true when Dr. Warren directed the internship program, students complete a variety of projects. (See Appendix II for a summary of the projects students have completed since I began directing the program in 1981.) Most of the internships are non-paying ones, although there are sometimes paying ones. For example, the intern who worked at Halliburton Services in Duncan, Oklahoma, was a paid employee. She served a dual function of computer programmer and technical writer/editor; she worked a 40-hour week for 2 months during the summer. The Oklahoma State University Arts and Sciences Institutional Research Department would employ the right intern part time (approximately 20 hours per week) for a semester or probably for as long as the intern continued in school.

Most of the internships are also project ones, although a few involve working a set number of hours per week rather than completing a project (for example, the one at Halliburton mentioned above). Also I have had two students complete an internship at the State Department of Vo-Tech in Stillwater. For that internship, students work 120 hours (usually 20 hours per week for 6 weeks) doing whatever the supervising person wants them to do. As long as the student has some training in grammar and writing (those majoring or minoring in English, journalism, or technical writing qualify), there are no other requirements. However, the more training students have in technical communications, the more specialized the work they can be assigned to.

My students have done a variety of projects for many different employers. Persons directing an internship program need use only their imaginations to find suitable on-the-job experiences for their students. Some examples of projects are

°revising a booklet used by a local pediatrician

°writing a brochure for the Domestic Violence Center

°writing, editing, and producing a newsletter for Parents and Teachers For Young Children

°editing (copy and production) a book of papers presented at the 1982 Southwest Cultural Heritage Festival at Oklahoma State University

°editing a curriculum manual and preparing it for the printers

°writing instructions for students using a computer simulation program for breeding cattle

My goal is to expand our program so that students also have the opportunity to complete paid internships that consist of full-time work either in the summer or during a semester. Currently, however, our internship program gives students the practical, on-the-job experience needed to train them satisfactorily to meet the demands of the world outside of academia.

Appendix I

Internship Forms

General Information
Vacancy
Application
Assignment Sheet
Employer "Contract"
Employee "Contract"
Log
Progress Report
Final Report
Mid-term Evaluation
Final Evaluation

Appendix II

Internship Projects

Employer	Job Title	Job Description/Duties
Stillwater Pediatrician	Technical Editor/Writer	Revise booklet "A Guide to Health Care of Infants and Children"
Stillwater Domestic Violence Center, Inc.	Writer/Editor	Write a brochure stating what the center does, what services are offered, what the statistics are, what the Rape Crisis Team is. Also, compile a list of different printers' costs for printing brochure.

Employer	Job Title	Job Description/Duties
Parents and Teachers for Young Children	Technical Writer	Write a newsletter, compile a resource directory, assist in writing a magazine article.
Petroleum Technology and Mechanical Power (OSU)	Technical Writer	Research the program and present the material in a brochure that explains the Petroleum & Mechanical Power Program to industry.
English Department (OSU)	Technical Writer	Revise the Department's Course Description Book and write 2 newsletters.
Agriculture/ Animal Husbandry (OSU)	Technical Writer	Research a computer simulation program for breeding cattle. Write a handout for students and a brochure for farmers. Write a brochure describing the graduate program in agriculture.
State Department of Vo-Tech	Curriculum Proofreader and Editor	Edit and proofread assigned projects. Work with technical writers.
Plant Pathology (OSU)	Technician/ Technical Writer	Revise and edit papers for journal publication.
Halliburton, Duncan, OK	Computer Programmer/ Technical Writer	Revise training manual and other ones. Prepare evaluation form for training program.
Public Information Office, Engineering Technology (OSU)	Information Editor and Writer	Research and write articles. Edit articles. Prepare and distribute press releases.
Arts & Science College (OSU)	Assistant Editor (copy & production)	Edit copy for book of papers presented at 1982 Southwest Cultural Heritage Festival (included tables, graphs, & photographs). Prepare copy for typesetter and follow it through printing.

ENGINEERING A PROFESSIONAL TECHNICAL COMMUNICATION DEGREE

VICTORIA M. WINKLER
DIRECTOR OF TECHNICAL COMMUNICATION
UNIVERSITY OF MINNESOTA

Abstract

Just as engineering is the application of scientific principles to solving practical problems, technical communication is the application of communication principles to designing, producing and disseminating scientific and technical information to a variety of audiences. If our aim in post-baccalaureate instruction is to turn out effective technical communicators--practitioners of the art--we must design a curriculum which balances theory and application, a knowledge of science and technology with competence in communication skills. The Master of Agriculture with a concentration in Technical Communication is one such professional degree offered at the University of Minnesota. The degree program was designed with enough flexibility for people with a variety of undergraduate degrees who now want to retrain to pursue careers as technical communicators. It enables them to fill in the gaps in their backgrounds and provides them with a marketable degree.

The following paper describes the five communication areas in which these students are expected to gain competence (writing and editing, oral communication, visual communication, organizational communication, and communication theory and research) and the

secondary area of study in a scientific or technical discipline. The primary and secondary areas of concentration are integrated in a final applications-oriented paper and seminar presentation.

The objectives of the Master of Agriculture Degree Program (MAg) at the University of Minnesota are two-fold:

- to provide post-graduate training and education for students with no previous training in technical communication, and
- to enhance and advance professional competence for those who have already made a career in technical communication.

Meeting the Applicants' Needs

The clientele our program serves has been changing over the past two years. Initially, the students applying for the MAg program had undergraduate degrees in agricultural disciplines; however, since 1980, most of the applicants hold degrees from the College of Liberal Arts and almost half have been working for two to seven years in business or industry. Many applicants who have work experience have been doing work related to technical writing, editing, or publishing and wish to pursue advanced training that will provide them with credentials in the technical communication field. In other cases, the applicants are involved in major career changes. Those who are changing careers have researched various career options, and they have chosen technical communication as a result of career counseling, their interest and ability in writing as determined by standard tests, and the career opportunities in the field. A few applicants already hold an MA or MS degree in disciplines where jobs are scarce. Regardless of their reasons for wanting to enter the program, all of our applicants are seeking a degree that will make them marketable and will teach them practical transferable skills.

The challenge that we faced was designing a degree program which would strike a balance between theory and practice. The MAg degree was designed as a professional rather than a research-oriented degree. Since it requires an integrating paper rather than a thesis or series of "Plan B" papers, it is better suited to students who want to become practitioners of the art rather than to those who see the Masters as a stepping stone to a PhD and to a career in teaching or research.

"Resource"-ful Faculty

The composition of the Rhetoric Department provides a unique advantage in engineering a professional Tech Comm degree. Ours is not a "rhetoric" department in name only: the Department is composed of writing/editing specialists, speech communication specialists, reading and listening specialists, rhetorical theoreticians, and even a researcher steeped in quantitative research analysis. To complement their academic training, many of the members of the Department have acquired industrial experience either through contract work or consulting with industry. We maintain and update our industry ties regularly. We participate in professional organizations, like the STC, to enhance our knowledge of what practicing technical communicators need to know. Consequently, the communication mix within the department, the range of interests of the faculty, and their practical experience in business and industry

33

have enabled us to develop a professional degree which truly meets the practitioner's needs.

A Professional Tech Comm Degree

The MAg program with a concentration in technical communication can best be understood by thinking of it as 45 quarter hours of coursework at the 5000 (graduate) level divided among a primary area of concentration (technical communication--18 hours minimum), a secondary area of interest (science or technology--18 hours), and an elective to be taken in the College of Agriculture (9 hours).

The Communication Component: Primary Coursework

We identified five communication areas in which we believe every technical communication specialist should have competence:

1. Writing and Editing
2. Oral Communication
3. Visual Communication
4. Organizational Communication
5. Communication Theory and Research

(For a short synopsis of the courses offered in each of these areas, refer to Appendix A).

Applicants for the degree must complete 45 credit hours at the 5000 level and write an integrating paper to be presented at a seminar to be awarded the degree. A minimum of 18 quarter hours must be taken in the Technical Communication area. Another 9 quarter hours may be taken from anywhere within the College of Agriculture. Most students elect to take these nine hours in an area related to Technical Communication, such as Agricultural Journalism, Applied Economics, Agricultural Education, or Rural Sociology. The remaining 18 quarter hours may be taken anywhere else in the University, as long as the courses are at the 5000 level. These remaining 18 hours provide a measure of flexibility that enables students from liberal arts disciplines to fill in the gaps in their scientific or technical backgrounds and to develop competence in a second area.

Science or Technology: Secondary Area

As part of their 18 hours in a secondary area, students may take courses in technical drawing and computer science to prepare them to work in engineering or computer related fields. Others take a series of related courses in the health sciences to prepare them to work in medical writing. The coursework in this secondary area need not all be in one discipline; however, it must compose a cohesive series of courses that will prepare students to work in a particular business, industrial, service, or governmental setting. For example, students who wish to become medical writers often take courses in anatomy, physiology, medical terminology, basic electronics and computer science to prepare them to work for a company like Medtronics (which makes cardiac pacemakers). If they are preparing for careers in medical editing with a major research facility or clinic, their choice of courses usually includes more biological science courses rather than the electronics or computer science courses. In other words, once students decide in which area they intend to apply their communication skills, they select an array of courses to familiarize themselves with the concepts and terminology of that area of specialization. With the resources of the entire University to draw upon, the students can design a highly specialized and indivualized program.

The Student/Advisor Relationship

The role of the MAg advisor is very important in assessing the students' weaknesses when they enter the program to determine the most effective mix of communication courses needed to help them attain an acceptable level of competence. All prospective students have an intensive interview with the Director of the program to determine what program of coursework best meets their needs and to identify areas of weakness, strength, and areas of interest. Advising is also crucial when the students decide on their secondary areas of interest and begin to work closely with their regular faculty advisors to select a core of courses that will make them knowledgeable in their chosen technical or scientific areas.

To help students achieve a balance between theory and practice, the advisor assesses the students' previous work experience and academic background to determine which courses would be most useful. We find that most candidates from the College of Liberal Arts need more hands-on work. Advisors steer them into classes designed to teach them "how to produce a product" whether it is a technical manual, a brochure, or a newsletter. They are also encouraged to take the organizational communication courses, intensive writing and editing courses which teach them to write on demand, and lab courses which give them experience with word processers, key lining and meeting production schedules. On the other hand, students who have been working in industry need more theoretical courses to help them generalize from their experiences and to induce principles that can be applied in a variety of circumstances to solve communication problems. These students are directed into courses in rhetorical theory, dissemination and utilization of information, transfer of technology, and scientific and technical presentation. The advisors, therefore, work closely to provide advisees with the kind of guidance that apprises them of the needs of the marketplace while helping them to develop the skills to meet those needs.

The culmination of the advisors' work is in guiding the student in the preparation of the integrating paper. The effectiveness of the mix of theory and practice is demonstrated in the integrating paper. The students select a unique communication problem and design solutions drawing upon what they have learned in their communication courses and in the secondary area courses for this paper. They prepare an applications-oriented paper which is well-grounded in communication theory.

Why a Master of Agriculture Degree?

The bard tells us that a rose by any other name would smell as sweet. What's in a name? The most frequently asked question about the program is: Why is the Tech Comm program in the College of Agriculture? The answer is a historical one. The Rhetoric Department was founded in 1908 to teach basic composition and public speaking courses to students in Agriculture, Forestry and Home Economics on the St. Paul Campus of the University of Minnesota. In the 1930's scientific and professional writing courses were added to the curriculum, and in 1971 the Tech Comm major was established. In 1976 the MAg program was established with a concentration in Tech Comm.

The affiliation with the St. Paul Campus and the COA has been fortuitous for Tech Comm students for a variety of reasons. The electronics and computer fields currently employ a large number of our graduates, and these graduates have unique options and opportunities because of our affiliation with the College of Agriculture. Our proximity to College of Biological Sciences makes it easy for the students to take courses related to health service professions and the emergent industries related to genetic engineering and recombinant DNA. Because of EXTEND, an electronic data base for farmers, located on the St. Paul Campus, our students have the opportunity to gain experience with telecommunication networks and video text systems. They are involved in screen design, designing tutorials, and writing user-friendly documentation. Finally, since most of the agricultural and extension publications originate on the St. Paul Campus, our students have the opportunity to work in market research and the production of these publications. All of these opportunities provide them with hands-on experience which is transferable to many industrial and business settings.

The "old family farm" is becoming an electronic cottage and our students are involved in this transfer of technology. Therefore, our close association with the College of Agriculture works to the benefit of both the students and the Program.

In the MAg Program we are training people to act as liaison between the subject matter experts and data processing professionals, between designers of systems and users, between engineers and scientists and their publics. We train people to design coursework and to help disseminate information to the public in a form that is accessible and usable. The MAg in Tech Comm is helping to design solutions to the problems created by high technology and the information explosion.

For more information about the MAg in Technical Communication write to Dr. Victoria M. Winkler, Department of Rhetoric, 202 Haecker Hall, University of Minnesota, 1364 Eckles Avenue, St. Paul, MN 55108.

Appendix A. Primary Courses in Technical Communication

A. Writing and Editing
- Scientific and Technical Writing
- Writing for Publication
- Professional Writing
- Publications Editing
- Writing for Special Purposes:
  - Newsletter
  - Manual Writing
  - Grant and Proposal Writing
  - Electronic Text Editing

B. Oral Communication
- Scientific and Technical Presentations
- Interviewing
- Small Group Discussion
- Process of Persuasion

C. Visual Communication
- Technical Drawing
- Scientific and Technical Graphics

D. Organizational Communication
- Direction of Training in Business and Service Organizations
- Studies in Organizational Communications, Conflict and Change
- Managerial Communication
- Dissemination and Utilization of Information
- Transfer of Technology
- Authority and Power in Task-Oriented Communication

E. Communication Theory and Research

Rhetorical Theory I and II

Research in Communication Strategies

Theory Construction and Analyses in Communication

Research in Electronic Text Processing and Publication

UNDERGRADUATE AND GRADUATE PROGRAMS IN TECHNICAL WRITING AT PENN STATE

JACK SELZER
ASSISTANT PROFESSOR OF ENGLISH
PENNSYLVANIA STATE UNIVERSITY

Faculty in the Department of English at Penn State have been offering courses in technical writing since 1920. In 1966, under the direction of Professors William Damerst and Kenneth Houp, the department initiated an advanced course in technical writing and editing "for subject specialists and for others interested in careers as writers and editors" (as the University Catalogue for that year put it). Given that tradition and given the number of faculty at Penn State who specialize in technical writing, in other kinds of writing, or in rhetoric, it should not be surprising that the Department of English has moved in the past decade to institute formal undergraduate and graduate programs that prepare students for careers in technical writing.

This paper describes those programs: the undergraduate minor in technical writing, begun in 1976; and the concentration in technical writing within the Master of Arts in Writing, begun in 1980. As the descriptions will make clear, both programs have been shaped in part by the resources, complexities, and sociopolitical realities of a large and intricate university. Both programs are the products of the department's longstanding commitments to the teaching of technical writing, other kinds of writing, and rhetoric. Both profit from powerful resources: a department with technical writers, composition specialists, and a variety of professional writers of every kind; and a comprehensive university with faculty interested in graphics, journalism, television and film, speech, computer science, and the relationships between science, technology, and society. Finally, both programs are rooted in an assumption that guides all the department's writing programs--that student writers, instead of specializing in one kind of writing, can profit from exposure to many sorts of writing experience; in other words, that students ought to be writers first and technical writers (or poets or journalists or novelists or whatever) only second.

Background

Before I describe the two programs, let me give a short introduction to the large and complicated Department of English at Penn State. For understanding our size and complexity will help you to understand the logic behind our programs and the human resources we offer our students.

Figure 1 lists the programs that Penn State's sixty full-time faculty offer to undergraduate and graduate students. As you can see, some of our offerings are quite typical of a "traditional" English department. For example, we have an undergraduate major in literature; literature courses designed mostly for students majoring in other disciplines; and a large composition program that has been serving over 7,500 students per year. For graduate students we offer traditional master's and doctoral degrees in literature. Most of the faculty who teach those undergraduate and graduate courses in literature are interested in traditional literary studies.

But our department has some unusual features, too. For one thing, with the help of graduate students and lecturers we serve an unusually large number of students in our beginning and advanced courses in

A. UNDERGRADUATE PROGRAMS

1. Literature
    a) Majors [includes Certification Option]
    b) Non-Majors
2. Writing
    a) Majors
    b) Non-Majors
3. Composition Programs
    a) Freshman Composition
    b) Junior-Level Composition
        1. Writing in the Humanities
        2. Writing in the Social Sciences
        3. Business Writing
        4. Technical Writing
    c) Advanced Composition

B. GRADUATE PROGRAMS

1. Doctoral
    a) Literature
    b) Rhetoric
2. Master's
    a) Literature
    b) Writing
        1. Poetry Writing
        2. Nonfiction Writing
        3. Fiction Writing
        4. Technical Writing and Editing

Figure 1: Programs in English at Penn State

business and technical writing. (We offered 120 sections in those areas in 1982-83.) As a result, five or six faculty have a professional interest in those fields, and a number of other faculty teach the courses on occasion. For another thing, the department's commitment to rhetoric and composition is quite serious. Not only do we have a well conceived and administered composition sequence, but our graduate students may now specialize in rhetoric as they pursue the Ph.D in English. Consequently, we have half a dozen or more faculty who regularly publish on rhetoric and composition. And outside the Department of English, especially in the departments of speech and philosophy, we are supported by a number of faculty whose major scholarly interest is rhetoric. (For example, the journal Philosophy and Rhetoric is published by Penn State.) Those rhetoricians and composition specialists have quite a bit to offer to prospective technical writers.

Finally, and most unusually, the Department of English offers undergraduate and graduate options in writing. While many schools offer courses in "creative writing," not many allow students to concentrate on writing within the English major. Fewer still offer the breadth and depth that we do in our writing courses: last year we offered about sixty different sections of fifteen different courses in fiction writing, article writing, poetry writing, science writing, biographical writing, script writing, and editing. As a result, most Penn State English majors choose the writing option. And as another result, we have more than a dozen accomplished professional writers on our faculty--poets, novelists, short story writers, playwrights, a biographer, a science fiction writer with experience as a technical writer and editor, even a science writer who is currently science editor for Popular Science. Moreover, one of our "poets" has published essays and stories as well; one of our "novelists" has written three collections of poems and at least twelve volumes of nonfiction; and several write literary scholarship. No one uses the term "creative writing" at Penn State. Whether they are most interested in literary scholarship, technical writing, poetry writing, article writing, fiction writing, or freshman composition, our faculty agree that every kind of writing requires creativity. And they agree that learning to do one kind of writing can make you better at every other kind.

This description oversimplifies things quite a bit. After all, many faculty here serve several of these programs, and students concentrating in one program usually take courses in several others. Furthermore, there is considerable rivalry among programs here, as you might expect--literature faculty, writers, and composition faculty are at times quite wary of one another. Nevertheless, our diversity is much more of an asset than a liability: it gives us a chance to offer substantial programs that have as much breadth as depth, as much flexibility as firm direction. And that goes for our two technical writing programs, too.

The Undergraduate Minor in Technical Writing

Penn State's minor in technical writing represents a sort of marriage between our Writing Option (offered to majors) and our technical writing courses (offered mainly to students in engineering, science, and agriculture). When the Writing Option for English majors was started, it was clear that our advanced writing courses were as attractive to many students outside English as to English majors. Often those "outsiders" were majors in science, engineering, and agriculture, for Penn State has large enrollments in those colleges. Thus, the department wished to offer some kind of directed, advanced instruction in writing to people who did not wish to major in English.

At the same time, English majors in the Writing Option began showing up in technical writing courses originally designed for scientists and engineers. Our writing majors are required to take an eighteen-credit "Area of Knowledge" as part of their training, so that they will be able to write with confidence about some area of expertise. Many of those students chose science or engineering as their area of knowledge, and naturally enough they also enrolled in technical writing courses to improve their prospects for employment after graduation. The department wished to formally direct and certify their preparation as technical writers.

Consequently, since it was dreamed up in the mid-1970s, the Minor in Technical Writing has served two kinds of students. We offer directed instruction in writing to students not majoring in English--for example, we teach polymer chemists and computer scientists how to write better so that they can succeed better as professional scientists or computer experts. And we offer English majors who can write a chance to learn enough polymer chemistry or computer science through our Area of Knowledge requirement that they can pursue a career as a technical writer. According to Professor James Holahan, who coordinates the program, about sixty students so far have completed the minor, about a third of them English majors and two thirds specialists in other disciplines.

What does the program consist of? As you can see from Figure 2,

---

Required Courses (6 credits):

English 218: Technical Writing (3 credits)

English 418: Advanced Technical Writing and Editing (3 credits)

Electives (12 credits):

Choose one: (3 credits)

English 210: The Process of Writing
English 215: Article Writing
English 421: Advanced Composition

Choose two: (6 credits)

English 415: Advanced Nonfiction Writing
English 416: Science Writing
English 417: Editing
English 418: Advanced Technical Writing [may be taken for 6 credits]
English 495: Internship [may be taken for 6 credits]

Choose one: (3 credits)

Humanities 101: Modern Science and Human Values

Science, Technology, and Society 435: The Interrelation of Science,
Philosophy 435: Philosophy, and Religion

Science, Technology, and Society 480: Technology and Values
Liberal Arts 480:

TOTAL: 18 CREDITS

Figure 2: The Technical Writing Minor at Penn State

students minoring in technical writing must complete at least six courses. Two are required: Technical Writing (the standard introductory course for juniors and seniors in science and engineering) and Advanced Technical Writing and Editing (an ambitious course for advanced undergraduates and graduate students from science and engineering and for a few undergraduates and graduate students in English). In addition, students must take three other courses in writing besides freshman composition: an intermediate-level course that introduces writing techniques useful in many contexts (either English 210, The Process of Writing; English 421, Advanced Composition; or English 215, Article Writing); and two advanced courses (either English 415, Advanced Nonfiction Writing; or English 416, Science Writing; or English 417, Editing; or one of the department's excellent internships).

Finally, students must complete a rather unique requirement: a course that explores the impact and implications of science and technology on society--either Modern Science and Human Values; or The Interrelation of Science, Philosophy, and Religion; or Technology and Values. Partly this last requirement recalls a political reality. In the days before Penn State offered minors, it did permit "non-major options," as long as those options were interdisciplinary in some way. Since these courses on science, technology, and society are not offered in English, they allowed the "interdisciplinary" option in technical writing to gain university sanction. But now that disciplinary minors are permitted here we still retain this last requirement, for the courses juxtapose the sciences and humanities in ways that are especially productive for writers. The courses examine relationships among disciplines in ways that anticipate the professional activities of many technical writers. Moreover, the courses direct students to some particularly interesting members of the faculty--experts in the humanities or science or technology who have acute ethical sensibilities, special concern for the ways science and technology affect our civilization, and a keen appreciation of how writing can promote public understanding of science and technology.

How well does the Technical Writing Minor "work"? It is too early to tell how well our students profit in their careers from the minor, though we plan to follow up on our graduates in the near future. The minor does seem to be filling an educational need among Penn State students, however, and it does provide some of them with a credential they can use to find entry-level positions in technical writing. Faculty at Penn State are convinced that the program prepares students to excel in those positions, too.

The Concentration in Technical Writing Within the M.A. in Writing

In addition to its undergraduate minor, Penn State also offers advanced training in technical writing. To complement our advanced degree programs in literature and to capitalize on our large and accomplished writing faculty, the Department of English moved in 1980 to establish a master's degree program for prospective professional writers. Students pursuing the M.A. in Writing must concentrate in one of four specializations: poetry writing, fiction writing, nonfiction writing, or technical writing and editing (see Figure 3). Because we offer that specialization in technical writing, our master's program has much in common with other advanced degree programs in technical writing around the country; but because the specialization exists within the broader rubric of the M.A. in Writing, our program also has some unusual features.

What are those unusual features? First, note that we offer the Master of Arts degree, not a Master of Science. As a result, our program is perhaps a bit more "arts-oriented" than some others. (See Figure 4.) For instance, our students may take all of their courses in the College of Liberal Arts. Like their peers in literature, they must take a course in Research Methods. They may choose to count as many as three courses in literature toward their degree. And they must fulfill a foreign language requirement (or complete two courses in computer science).

That "arts orientation" has some disadvantages. Our program may not be quite as practice-oriented as other programs; depending on the particular courses they choose, our students may not be as completely versed in particular production methods as students from other schools. In addition, the program is under the supervision of Penn State's entire graduate faculty in English, many of whose specialty is literary scholarship; in theory, therefore, the program runs the risk of being dominated and directed by faculty who have only a superficial interest in or knowledge of technical writing.

But the "arts-orientation" has its advantages, too. At least initially the M.A. was chosen over the M.S. (or the M.F.A. for poets and fiction writers) on logistical grounds. That is, by sticking with the M.A. we avoided the potentially lengthy curricular struggles that starting a new degree program would have entailed. That was especially useful at a time when university budgets are tight and when new programs are therefore difficult to initiate. In addition, we have found that by having all master's students pursue the arts degree we add coherence to

A. Technical Writing and Editing	B. Poetry Writing	C. Nonfiction Writing	D. Fiction Writing
1. English 501 (Research Methods)	English 501 (Research Methods): this course, required of all graduate students, is adapted to the needs of students in writing.		
2. Four courses in technical writing and editing.	Four courses in writing, concentrating on the genre of the student's writing concentration.		
3. Other courses in writing or rhetorical theory (6-9 credits).	Other courses in writing or rhetorical theory are optional for students concentrating in poetry, nonfiction, or fiction.		
4. Individual Study (3-6 credits), culminating in a final project.	Individual Study (6 credits), culminating in a final project in poetry, nonfiction, or fiction.		
5. Literature optional--see 6d below.	Four courses in literature, concentrating in the genre of the student's major writing interest.		
6. Six to nine credits from the following possibilities: a) Courses in journalism, film, graphics, etc. b) Internship. c) Courses in an area of technical or scientific knowledge. d) Courses in literature. e) A combination of a-d.	Additional courses for students concentrating in poetry, nonfiction, or fiction: none.		
7. Reading knowledge of a foreign language or two courses in computer science.	Reading knowledge of one foreign language.		
8. Final project.	Final project.		

Figure 3: The M.A. in English with an Emphasis in Writing

Required Courses (15 credits):

English 501: Research Methods
English 515: The Writing of Nonfiction
English 417: Editing
English 418: Advanced Technical Writing and Editing
English 518: Technical Writing: Current Theory and Practice

Electives in English (6-9 credits):

English 414: Biographical Writing
English 415: Advanced Nonfiction Writing
English 416: Science Writing
English 418: Advanced Technical Writing and Editing**
English 419: Advanced Business Writing
English 502: The Theory and Teaching of Composition
English 515: The Writing of Nonfiction**
English 581: Contemporary Literary Criticism
English 582: Rhetoric and Poetics

**denotes that the course may be taken for 3-6 credits

Other Electives (6-9 credits):

1) Courses in journalism, graphics, typography, film, television, or other areas relevant to technical writing.

2) English 597: Internship (3-9 credits).

3) Courses in an area of technical or scientific knowledge.

4) Courses in literature, preferably emphasizing nonfiction prose.

5) A combination of 1-4.

English 596: Individual Study (3-6 credits): culminates in final project.

TOTAL CREDITS: 33

Reading knowledge of a foreign language or 6 credits of computer science.

Final Project

Figure 4: The Concentration in Technical Writing at Penn State Within the Master's Program in Writing

our graduate program. Since all students take Research Methods and some sort of language, and since they are likely to take several other courses together, our large graduate program gains a measure of common enterprise and principle. More important, because our program is located in the liberal arts, our students have the opportunity to learn from areas that are often closed to prospective technical writers. Professional technical writers and technical writing faculty for years have profited from reading a range of literatures, from studying language, and from incorporating insights from classical and modern rhetoric and recent movements in literary criticism. Our students, if they wish, can choose courses in all those areas. Finally, we find that the Master of Arts degree usefully emphasizes our link with the tradition of the liberal arts, a tradition that has writing and rhetoric at its core. To associate technical writing with that tradition is to regard it not as a narrow "skill" that comes after the real thinking is done, but as a liberating activity that is itself central to scientific and technical thought. For it is possible to be too practice-oriented, too limited to writing techniques and technologies. We want our students to be capable writing technicians, but we also want them to be flexible and resourceful and comfortable with the theoretical questions that intrigue their colleagues. Perhaps, then, our modest "arts orientation" helps to explain why most graduate faculty in English, even those whose interests might seem rather alien to technical writing, have so far felt quite comfortable with the program.

A second unusual feature of the Penn State program is that it is merely a concentration within an M.A. in writing; strictly speaking, it is not a degree in technical writing at all. That explains why students are required to complete English 515 (The Writing of Nonfiction), why we require no courses in oral communication, and why our students are free to take courses like Biographical Writing, Advanced Nonfiction Writing, and Advanced Business Writing. It may be that by permitting such enrollments we make our program too amorphous and incoherent; that we fail to give the program definition and clear identity; that we fail to offer a recognizable product to prospective employers.

But, again, we feel that the advantages of the arrangement far outweigh the disadvantages. Most obviously, by acknowledging the department's view that students ought to become writers first and technical writers (or novelists or poets or journalists or critics) only second, we enable our students to exploit some of our strongest departmental resources. Our courses in Biographical Writing and The Writing of Nonfiction are some of the most respected courses in our curriculum. The faculty associated with those courses and the other courses I have mentioned are some of the most knowledgeable and ambitious writers on our staff. Since those faculty members are so strong and since they cover ground that most technical writers are likely to cover during their professional careers, it seems responsible to direct our students to them --especially since (as I will show later) students are also required to spend considerable time with our technical writing specialists. Moreover, by making such courses and faculty available, we can give our technical writing students considerable flexibility. Those who come to us with some previous work in a given area can take courses in these related areas instead of being forced into redundancies, and our other students can pursue courses particularly appropriate to their individual career goals. Finally, by allowing various sorts of writers and rhetoricians (and even some literature specialists) to mix freely, we give our courses an invigorating heterogeneity. When prospective technical writers and composition teachers can talk about writing with fiction writers and journalists and students of literature, everyone benefits.

That is not to say, of course, that our students are not solidly grounded in technical writing. I hope that the preceding paragraphs have not overemphasized our unusual features, for in most respects our students receive the same professional training as students in other graduate programs in technical writing. As you can see from Figure 4, all our students complete a required list of courses basic to the discipline: Advanced Technical Writing and Editing; The Writing of Nonfiction; Editing; and Technical Writing: Current Theory and Practice. From a first set of electives most students choose the Science Writing course as well as one or two other courses in writing or rhetoric. A second set of elective courses, all specifically relevant to technical writing, gives students considerable flexibility so that they can investigate areas of particular interest or relevance to their careers: students may enroll in a course or more outside the department (in journalism, graphics, typography, linguistics, speech, film production, television production, photography, or business administration); they may take a part-time or full-time internship in technical writing; they may take courses in science, engineering, computer science, or any other area of knowledge relevant to their career plans; or they may do a combination of those things. Furthermore, since students are permitted (even encouraged) to fulfill their foreign language requirement by taking courses in computer science, most of them leave Penn State with a solid introduction, at least, to computers. (It should go without saying that they leave with the ability to use sophisticated word-processing equipment; for that matter, many of our graduate students in literature compose on word processors by the time they finish their degrees.) Finally, by means of an Individual Study course, students toward the end of their training produce a substantial piece of technical writing under the direction of a faculty member. When their final projects have been approved by a committee of faculty members, our students have signified that they can perform with professional accomplishment. Students may complete the M.A. with a minimum of 33 credits, but every student so far has chosen to take additional credits from the second set of electives.

Conclusion

The programs in technical writing at Penn State, therefore, are really only slightly different from minors and master's programs at other universities. We give our students the same kind of concentrated direction in technical writing that other programs provide; at the same time, the slight modifications that we have made on those other programs enable us to mobilize for our students the unique resources of our department and university.

8

TECHNICAL WRITING INTERNSHIPS AT EASTERN WASHINGTON UNIVERSITY

JUDITH KAUFMAN
DIRECTOR, TECHNICAL COMMUNICATIONS PROGRAM
EASTERN WASHINGTON UNIVERSITY

Internships with cooperating businesses and non-profit organizations are an important component of all technical writing degree programs at Eastern Washington University (EWU). Between September 1981 and June 1983, 18 students earned 185 quarter credits in writing placements both on- and off-campus. Most of these internship credits (153) were earned by undergraduates participating in a structured series of work experiences during their senior year. (The graduate internships are less structured and will not be discussed in this paper.) EWU's undergraduate internship program has three particularly interesting features: 1) students are encouraged to participate in multiple internship placements for from two to four quarters; 2) the student, the work supervisor, and the faculty sponsor must sign a formal learning contract for each quarter's placement; 3) the technical writing faculty receives extensive support in administering these learning contracts from the university's Center for Extended Learning.

When I came to EWU in 1979, the undergraduate internship was described to me as a single, full-time placement to be taken during the student's final quarter or during the summer preceding the senior year. I administered the program in this way for two years, but found that the system had two fundamental weaknesses: a single placement provided insufficient opportunities for students to develop portfolios of work produced outside the classroom, and the abrupt transition from the classroom to the workplace gave students without prior work experience insufficient time to learn basic job skills.

In 1981 I began to recommend that students pursuing a B.A. with a major in English - Technical Communications complete a preliminary part-time placement in a familiar setting (usually on-campus or in an existing job) before attempting a final off-campus placement. (Students in the B.A. program are required to earn at least five internship credits, the equivalent of 200 hours of work experience; they may earn a maximum of 20 credits in internship placements.) To ensure the continued availability of suitable preliminary placements, I have a standing agreement with the campus laboratory school that a technical writing intern will write and edit the school's monthly newsletter.

The results of the multiple internship program have been excellent. Students have been able to build significant portfolios and, more importantly, have had the opportunity to develop their job skills. In the past two years, four students who had difficulty adjusting to their preliminary on-campus placements have learned from this experience and gone on to receive high praise from supervisors in their final placements. One student, characterized by her first (on-campus) supervisor as immature, was called "totally competent" by her final (off-campus) supervisor, who went on to say, "Her professionalism as an intern added tremendous credibility to the position for future interns."

The students' progress through their internship placements is charted by a series of learning contracts. The student, the work supervisor, and the faculty sponsor must agree on a learning contract at the beginning of each quarter. (Students continuing in a placement for a second quarter must complete a new contract.) This contract specifies not only what the student will do on the job, but also the learning that will result from these activities and the means by which this learning will be documented and evaluated. Students may, and often do, include improved job skills (e.g., more effective communication with managers) as well as improved writing and editing skills among their learning objectives.

The learning contract makes it possible for students to use regular part-time or full-time jobs for internship credit. The student employees can use the contract to focus on those areas in which they hope to improve during the quarter. Employers have been very receptive to this arrangement and may even give the students increased opportunities to demonstrate their skills. One student began her on-the-job internship by writing letters for her co-workers; she was soon asked to prepare her company's annual report.

The learning contracts used in the technical writing program were designed by the university's Center for Extended Learning (CEL). In addition to the contract, the CEL provides students with a text explaining the goals of experiential learning and with assistance in locating a suitable placement. For faculty, the CEL offers guidelines for the evaluation of student learning and the awarding of credit. Students earn one credit for every four hours of work per week per quarter, i.e., one credit for a total of 40 hours of work. They may apply a maximum of 20 hours of internship credit toward the 180 hours required for a bachelor's degree. The CEL staff works actively with local businesses to develop potential internship sites and relieves the faculty of many administrative duties, such as processing supervisors' evaluations of student performance and awarding student stipends. (Interns may receive either credit alone or credit plus monetary compensation at the discretion of the employer.)

While relieving the faculty of many administrative chores, the CEL staff is careful not to interfere in the academic relationship between the faculty sponsor and the student. Although the CEL suggests general procedures for the assessment of student learning, the faculty sponsor retains sole responsibility for evaluating each student's performance and for assigning a grade. As part of the learning contract, the faculty sponsor agrees to assess the student's final written documentation of learning and to meet with the student at least three times during the quarter, including once at the work site. The faculty sponsor also receives a copy of the supervisor's final evaluation of the student's performance. Since a large part of the internship experience is learning to perform up to a supervisor's expectations, I personally give this evaluation great weight in determining the student's final grade.

Despite the assistance of the CEL, placing and supervising students in internships is time-consuming for the faculty. Therefore, in addition to providing guidelines for awarding student credit, the CEL has formulated guidelines for faculty compensation. The CEL recommends that faculty be awarded one hour of released time from regular teaching duties for every four learning contracts. During 1982-83, I supervised 16 learning contracts and had my classroom teaching load reduced from the departmental standard of 36 credits to 32.

I consider myself very fortunate to work for a university that puts a high value on experiential learning. I have no doubt that EWU's extensive internship program is of great benefit to our technical writing students. At the CPTSC meeting in Lincoln, I was asked if our internship program might pose a threat to the employment of professional technical writers. My experience indicates that this is not the case. I do receive periodic requests from non-profit organizations seeking unpaid interns to perform needed services (prepare a grant for the humane society; write a script for a community festival parade). Such organizations would not, however, be able to pay a professional writer to perform these services. My contacts with local corporations have revealed no interest in using interns as a source of unpaid or low-paid labor. In fact, corporations have refused to accept interns during periods when layoffs have forced reductions in their technical writing staffs. The corporate supervisors with whom I have dealt have all been concerned primarily with providing appropriate assignments and adequate supervision so that the interns receive a high-quality learning experience. One supervisor recently told me that her company sees internships as a form of community involvement and that acceptance of interns has in no way affected the firm's employment of free-lance professionals. Isabelle Green, a site developer for the CEL, confirms my impression that corporations in the Spokane area see internships as a learning experience and that they take responsibility for providing the students with adequate supervision and training. This training can, of course, be of ultimate benefit to both the student and the employer. One of my graduating seniors has just been hired part-time by the firm for which he did his final internship. Thus, far from reducing the opportunities for professionals, an active internship program can help interns become professionals.

A TWO-YEAR PROGRESS REPORT ON THE TECHNICAL WRITING PROGRAM AT CASE WESTERN RESERVE UNIVERSITY:
WHAT'S NEW ON EUCLID AVENUE?

MARILYN SCHAUER SAMUELS
ASSOCIATE PROFESSOR
CASE WESTERN RESERVE UNIVERSITY

Two years ago in Seattle, I attended my first CPTSC meeting and presented a report on the position of technical writing at Case Western Reserve University. My main theme was how to adapt technical writing programs to the very different needs and views of two distinctive audiences: the Science and Technology community and professional schools, on the one hand, and the Humanities or Liberal Arts community, on the other.

To dramatize this dilemma, I used the following analogy:

> Picture, if you will, a wide, heavily-trafficked street with three lanes going east and three going west. This is Euclid Avenue in Cleveland, Ohio.
>
> On the north side of Euclid are the buildings of Western Reserve College and Severance Hall, home of the Cleveland Orchestra. On the south side are the buildings of Case Institute of Technology, the better faculty cafeteria, and the University Hospitals.
>
> Out in the middle of traffic is the technical communications program.

When I spoke to you in 1981, I was trying to change the traffic pattern on Euclid Avenue by talking with the faculty and students of both sides of the campus; identifying the different points of view of each;

and trying to adapt my explanations of the technical writing needs of the university as a whole to the perspectives of its many components. I wanted the support of each of these groups; at the same time, my goal was to create and preserve an independent integrity for the technical writing component of the English department, so that it would not be thought of merely as a service unit, but rather as a discipline that could interact productively with several other disciplines.

I will explain the progress that has been made in these efforts by addressing three questions:

1. What significant changes have occurred in the program between 1981 and 1983?
2. Why they occurred, or what kinds of strategies worked best?
3. What new problems or challenges have been created by the program's success, and what might be done to deal with them?

1. What Are the Significant Changes?

	Before	Now
a. staff	The technical writing component of the English Department was a one-woman show run by a non-tenured assistant professor in addition to her full-time teaching responsibilities. Only one course was offered regularly, and students took it catch-as-catch-can depending on whether or not it conflicted with priority requirements.	Beginning this Fall, the technical writing component of the English Department will consist of one full-time tenured associate professor, who will be given released time for program development, and two newly hired tenure-track assistant professors, each of whom will teach technical writing part-time.

Before	Now
b. courses	
-1 section of freshman composition every other semester	-3 sections of freshman composition every year
	-1 sophomore level course
-1 section of a junior/senior level course every semester	-more than one section of a junior/senior-level course every semester
-1 internship course once a year	-several internships, part- and full-time throughout the year
	-development of a series of special mini-courses for faculty, staff, students, and the business community
	-a graduate course on research and theory
	-a training course for graduate students in teaching technical writing

But the most significant change that has altered the traffic pattern on Euclid Avenue and made all these other changes happen is a change in attitude. This change in attitude is expressed in a proclamation handed down by our new President and frequently quoted on campus: "The role of our university should be to teach undergraduates how to communicate effectively in a technological society."

I claim no direct responsibility for the President's statement, but I do claim to have learned something about the basic nature of academic institutions that I was able to use to technical writing's advantage.

2. How Did These Changes Come About?

You will probably agree with me that one characteristic of a university is the tendency for no one to know what anyone else is doing. This lack of communication among faculty and staff is not limited to apparently diverse groups such as Science and the Humanities, but operates even within departments: how much does each of us know, for example, about how our fellow department members teach, what research they are doing, what experts in their areas think about their research?

As I look back on why and how the position of technical writing changed at my university over a six-year period (1978-1983), I realize that the change was largely due to turning this liability into an asset. As a representative of technical communication, I was able to circumvent and counteract some of the isolationism of different branches and individuals on my campus; I was able to make them aware of one another and, in the process, make them aware of and able to cooperate in the offering of techcal writing courses on our campus.

To anyone starting a technical writing program from scratch today I would say that the secret is visibility. Your strategy should be a long-range plan (these things do not happen quickly) to make all levels from freshmen to the Board of Trustees aware of the nature and value of technical writing on a university campus.

There are many ways to make a technical writing program, or the need for one, visible. For example:

-Volunteer to speak

    -for courses other than those you teach, i.e., an interdisciplinary course or a senior project seminar in a scientific/technical major.

-for student organizations, i.e., the student management association or the computer club.

-Volunteer to arrange meetings of the minds and symposiums between faculty of different disciplines on subjects such as definitions of the mind, functions of language, ethical responsibility of modern science, etc.

-Let the placement office and speaker's bureau identify you as the technical communications person on campus.

-When faculty from other departments call about student writing problems, assist them or locate the person who will.

-Help students prepare oral reports for senior projects and accept their invitations to attend their presentations. It is a good opportunity to meet professors from other departments and take part of the credit for the superior performances of the students you assisted.

These and other efforts in public relations have a cumulative effect. Eventually, people throughout the university come to you to develop technical writing courses for them. Next spring, for example, I will teach a series of mini-courses in cooperation with the Biomedical Engineering Department on how to write lab reports.

3. What Are the Problems/Challenges Created by the Technical Writing Program's Success?

Basically, these new challenges are financial and political. The technical writing program is turning into a multi-faceted operation, funded in bits and pieces by different management centers of CWRU, by private business contributions, and by grant money. Is there a way to consolidate funding, and what should the main funding source be?

68

As we grow, we must avoid the pitfalls of seeming to compete with or threaten other components of the English Department, such as the Freshmen Composition Program, the Media Program, and the Remedial Writing Center, as well as the programs of other departments, such as Speech Communication.

Should the technical writing program continue to expand, will it be viable as one of several small components of a fifteen-member English department? If not, what are its options? The question is really more general: where can a technical writing program thrive best within a university structure?

I am reminded of an exciting 4C's session in 1978 in Washington, D.C., at which the teams of Mathes and Stevenson and Carson and Whitburn hotly debated whether technical writing belongs in Engineering or in English. The arguments on both sides are still valid, and the issue is still debatable today.

The technical writing program at Case Western Reserve University, which is no longer out in the middle of traffic, will have to resolve this debate based on a careful analysis of the needs and capacities of its students and staff. But logistics, at least, presents no difficulty. At out university, the Engineering and English departments are located conveniently across the street from each other--on Euclid Avenue.

TEACHING PROBLEM SOLVING STRATEGIES IN THE TECHNICAL COMMUNICATION CLASSROOM

JOANN T. HACKOS
ASSOCIATE PROFESSOR OF ENGLISH
UNIVERSITY OF COLORADO AT DENVER

For the past few years, teaching students problem-solving strategies has played an important part in the composition curriculum. Witness Linda Flower's recent text, Problem-Solving Strategies for Writing, in which Flower guides the student through stages of problem analysis, ". . . moving from awareness of a problematic situation to a problem definition to a thesis."[1] The emphasis has been placed on teaching students to think through a problem thoroughly--to analyze an assignment, identify an audience, develop a solution, and write it all down. While composition instructors have recognized the importance of teaching problem-solving to their students, technical writing instructors have been more reluctant to adopt a new approach for reasons I discuss below. What I argue is that the technical writing instructor has a critical role to play in teaching engineering and science students to solve problems as well as to communicate their solutions effectively.

Teaching problem-solving strategies means attending to the way students think about their subject matter, to the cognitive processes that they use to understand complex information and ideas. We know that students cannot write effectively about what they do not understand. Asking them to do so makes writing appear to be a pointless and futile exercise. In fact, we reinforce their attitude that writing means "pleasing the teacher" by adhering to the conventions of formal written

English, and nothing more. We must instead reinforce the principle that form and content cannot be separated--that no one can write good essays that say nothing. We must pay attention not only to conventions of grammar and style but also to the technical content the students present in their written assignments and to the thinking that has led them to those conclusions.

In his essay "Teaching Writing by Teaching the Process of Discovery: An Interdisciplinary Enterprise," Lee Odell argues that "as we help students engage in basic cognitive activities, we can increase their chances of improving their writing and of understanding the content of our respective disciplines."[2] He suggests that the same processes that control thinking about a subject, control writing about it and that by helping students think more deeply and critically and demanding evidence of their thinking, we will help them learn to write more effectively. He urges faculty in every discipline to use the writing process to instruct their students in the cognitive processes of their disciplines. We have seen the result of his and others' recommendations emerge as a problem-solving approach to composition.

However, despite its adoption in the composition classroom, technical communication instructors have been slow to introduce a problem-solving approach to the technical writing classroom. A number of reasons can account for this reluctance: for one, I cite the traditional technical writing textbooks.[3] The textbooks that dominate the field endorse formulas that encourage students to write everything from the description of a mechanism to the long technical report according to a prescribed set of content and stylistic rules. These standardized formats are advocated independently of the reader-writer-subject context the writer may be

.71

working in.

The focus in these textbooks, and consequently in many curricular designs, is upon the product rather than the process of technical communication. This focus harkens back to teaching writing by teaching students to analyze well-written essays. Our students had a difficult time relating what they learned by this analysis to their own writing processes because they were looking only at an end product, which they failed to identify as a product of extensive planning and editing. They gained little if any insight into the processes that took the original writer from his research or investigation to the well-written essay. The same pedogogical method holds in the technical writing textbooks and curricula that focus upon products. The student is often unable to recognize the relationship between his own confused method of analyzing information and reaching conclusions and the end product he sees in the textbook. And, if he is taught to solve his dilemma by filling in the blanks of a standardized format, he will only rarely come to understand the integral relationship he must establish among his reader, himself, and his subject to argue his case effectively.

A second reason for the technical writing instructor's apparent lack of interest in the problem-solving approach is the traditional placement of the technical writing course late in the engineering curriculum. Often taught in the junior or senior year, technical writing depends upon the student's knowledge of his or her major field for paper topics, including the pervasive "library report." Many writing instructors assume that students are being taught to solve problems in their science and engineering classes. They also assume that students have mastered the subject matter they are asked to report upon and can easily use it to produce documents according to standard formats. What they often do not realize is that in an effort to get their students up to minimum competency in a technical subject, engineering and science faculty members have little time left to teach problem solving, particularly open-ended problem solving in which complex problems have many possible solutions.

The third reason for a reluctance to adopt a new curricular approach stems from the writing instructor's view of his or her own role. Many writing faculty approach technical writing as an advanced composition course that uses technical subject matter for paper topics. Since they have rarely done any technical writing themselves, worked in industry, or read many examples of inter- and intra-company reporting, they are unaware of the demands and dynamics of an industrial reporting situation. As a result, they pay too little attention to the content of the student reports because they feel more comfortable responding to issues of grammar and style. While they would never neglect the student's conclusions, thesis development, strategies, or argument in a literature or history paper, they are often unaware of flaws in the student's cognitive processes when the content is technical. This is precisely the situation which leads students to announce in disgust that they "can write a lot of 'bull'" for the technical writing instructor that they couldn't get away with in their technical classes.

All of these reasons, and others, while enforcing the status quo in the technical writing classroom, can also be used to argue strongly for a new approach--an approach that demonstrates the close relationship between problem-solving in engineering and in writing. Only when engineering students recognize that communication is an integral part of their professional preparation and begin to understand the relationship between

73

solving problems and communicating their solutions, will they be prepared for the communication demands of their professional careers.

Redesigning a Writing Curriculum

In 1978, members of the technical writing faculty at The Colorado School of Mines began working on revisions to the curriculum of the one-semester technical writing course taught in the Humanities Department. We faced the problems I have described above: the faculty had been using traditional product-oriented textbooks for a number of years; the technical writing course was offered in the senior year; and few of the instructors had any technical writing experience. Many were, in fact, teaching technical writing only because it was required. However, we faced a more immediate problem that forced us to rethink our curriculum: we had moved the course from the senior to the freshman year. As a result, we were faced with the problem of redesigning the course to work with freshmen instead of seniors. The old senior level course was very traditional in its design. It relied heavily on a traditional textbook that emphasized end-product formats rather than process; it also depended on the student's knowledge of the subject matter in his chosen major field to produce a final, so-called "major" report for the class. The course also suffered from a more serious problem; while we were ostensibly preparing students to write for the petroleum and mining industries that they were about to enter, the "major" report they were asked to produce was generally a traditional library research paper that bore no resemblance to an industrial report. In addition, our institution has a strong tradition of "fraternity files." Students who found the technical writing course of little value, nothing more than busy work, frequently borrowed their major reports from the fraternity files.

With the course moved to the freshman year, a change was necessitated. Freshmen lacked a subject matter on which they could draw to write a major paper. They knew nothing about engineering or any of the related fields in which they planned to major four semesters down the road. Consequently, the standard assignments in the traditional course became even more banal than they had been for the seniors. The description paper that had once been written on mining equipment now had to be written on the stapler or the compass. The process description focused on the process of tying a shoe. While there is nothing inherently wrong with these assignments, they do not encourage the students to view the course seriously. The students fail to see much connection between what they are doing in the classroom and what they think they will be doing in their careers.

An Emerging Dilemma

To combat the plagiarism problem and to stimulate student interest in the course, we decided to introduce low-technology, yet challenging problems to our students, ask them to solve these problems, and report on their solutions in writing and orally. We depended for the problems on our own faculty who had industrial experience, on our contacts in industry, and on members of our engineering and science faculties. However, our solution introduced another problem, one that we had only partially anticipated. Our students did not know how to solve problems!

A survey of our alumni, faculty, and industry representatives, completed in 1977, indicated that potential employers of engineering students place great importance upon the ability of engineering graduates to solve open-ended problems.[4] Yet, our graduates were often criticized for their lack of strong problem-solving skills. They were good at solving the traditional, textbook problems often given to young engineers, but when the problems became more complex, they ran into serious difficulties. We were also informed that they could not write.

Faculty throughout the school felt a need to identify the source of the students' difficulty with problem solving. What in our curriculum was permitting students to complete the program and yet be unable to solve open-ended problems? How could we change the curriculum to help students gain this ability? We knew that many courses in our curriculum relied heavily on memorization and textbook problems. Students were not getting enough experience with complex problems. The problems they had experience with were already completely defined and led to single correct answers. When confronted with complex problems, they balked. In our senior level writing classes, we had encountered students who felt comfortable with the textbook report formulas, even insisting on learning them. These students appeared to be threatened by a problem-solving approach, a behavior we observed in the technical writing classroom. Did it show up elsewhere? When we discussed our observations with colleagues in the engineering and science departments, we got some very interesting responses. They did not know how students in their classes went about solving problems. Generally, they saw only a finished product, a problem solution in which the wrong directions had been eliminated. With large lecture classes and enormous amounts of content to cover, they had little time for questions or discussion of problem-solving strategies. In addition, they required little, if any, writing that might have provided insight to the students' difficulties with complex problems.

At nearly the same time that we began to create a new writing curriculum using a problem-solving approach, we began studying William G. Perry's work on intellectual development in the college years.[5] Perry describes nine stages of intellectual development among college students in a liberal arts environment. The first stage, Dualism, describes the student who relies on authority for solutions to all problems and believes that all problems have one right answer. Under the pressure of the liberal arts curriculum, these Dualistic students find their belief in an absolute authority threatened. They generally move through a stage of modified dualism into what Perry calls Multiplicity, where their belief in absolute authority breaks down, only to be replaced by a belief that all solutions are equally valid.[6]

As humanities instructors, we had long recognized students in the Multiplicity stage. They were those who told us that one person's opinion of a poem's meaning was as good as another's. Therefore, they concluded, we had no right to give them low grades on their interpretations of literature since "everyone has a right to their [sic] own opinion."

While this developmental stage is commonplace in the humanities class, does the same student lurk in the science and engineering classrooms? Unfortunately, our engineering and science colleagues did not often confront students with problems that brought Multiplicity into play. Typical homework and exam problems had only one right answer, enforcing a Dualistic mind set which was a comfortable fallback position for a student struggling with Multiplicity.

In our original design for a new technical writing curriculum, we rejected the Dualistic approach by confronting our students with open-ended problems. As a result, the difficulties students were having with the problem-solving process as a result of their stage of intellectual development became clear.

When students wrote reports describing their solutions to problems given in class, they experienced great difficulty in organizing a coherent argument in support of their solutions. Originally, we thought this was a writing and logic problem. We believed that students were perfectly capable of supporting their conclusions; they simply failed to do so either because their writing skills were not developed enough to allow them to reveal the thought processes they had used, or they were not careful enough in the logical development of their reasoning. However, when we looked closely at the reports students wrote on their problem solutions, we confronted a manifestation that was also observed by engineering faculty members.

When we gave the students a complex problem to solve, we had expected them to evaluate the problem carefully, investigate a variety of problem solutions, and weigh the relative merits of each solution before reaching a decision and making a recommendation. Instead, the students looked cursorily over a problem statement and jumped to a solution independent of evidence and investigation. The engineering faculty immediately concluded that the students needed only firmer guidance, i.e., more faculty intervention, in much the same way they were used to intervening in the engineering classes. But that approach would only reinforce the students' Dualism. Instead, by examining the students' reports more closely, we began to identify another explanation. What we were seeing in the students was evidence of Multiplicity!

The students experienced no difficulty in jumping to conclusions without supporting evidence because they were unable to understand the importance of evidence. Just as they had reacted in the humanities courses, they relied upon the absolute integrity of individual opinion when an absolute Authority was denied them. In this "engineering" situation, they devalued evidence because it made no difference to them. When students are experiencing Multiplicity, they have no way of evaluating one opinion or problem solution over another unless an authority tells them that one is right and another is wrong. Once authority has abrogated this responsibility, i.e., by telling them that a problem can have many solutions, with varying degrees of "correctness," their only response can be what we had observed as 'jumping to a conclusion.' They do not feel obligated to prove that the conclusion they have reached is plausible, just, responsible, etc. when it is equal to all other solutions. In fact, the search for a solution becomes little more than a game they think the faculty is playing with them. Their reluctance to observe the quality of their solutions also emerges in small-group discussions that end too quickly because students believe nothing is left to discuss once a conclusion has been enunciated. Thus, the problems we were observing in their writing and thinking were direct results of their stage of intellectual development.

In the traditional technical writing course, emphasis is placed upon descriptive and expository writing for which an audience is not defined. In our new writing curriculum, our emphasis is on persuasive writing. We constitute the class into a company in which the faculty act as supervisor/coaches to the problem-solving groups. All of the problems the students are given arise from rhetorical situations in which there are identifiable actors, from outside clients to company officials. We try to make the fiction of the classroom company as realistic as we can, even to the extent of introducing real clients. In this context, students begin to understand that they must write to persuade.

It is in persuasive writing that the students' difficulties with problem solving become most clear. These difficulties can be easily hidden in expository writing because there is less need for compelling argument. Only in persuasive writing do the limitations imposed by their Multiplicity fully emerge.

Our Solution to the Dilemma

Once we identified the source of the students' difficulty with problem solving and, consequently, with writing, we had to find a way to help them learn about problem solving as we taught them to write more effectively. In 1980, writing faculty members joined engineering and science colleagues in designing and implementing a new program for the core curriculum called EPICS, which stands for Engineering Practices Introductory Course Sequence.[7] This course combined into a single, four-semester, 10-credit-hour program the subject matter orginally taught in Technical Writing, Engineering Graphics, Introduction to Computer Programming, Mapreading, and Oral Presentation. This program presented several advantages to the technical writing faculty: 1) it enabled us to team teach with the engineering faculty, 2) we could now teach writing and oral presentation over four semesters, instead of one, and 3) we could investigate helping students learn to solve open-ended problems, a major program goal.

We have now completed two years of the experimental EPICS program, funded by a grant from the Exxon Education Foundation, and we see positive evidence that our problem-solving approach fully integrated with communication skill-building is bearing fruit.

As the faculty responsible for writing instruction and coordinating writing with the problem-solving projects, we began by rejecting written work that failed to show evidence of the cognitive processes that had led students to solutions. We gave students models of good problem-solving techniques; we talked to them about the nature of evidence; we helped their groups function by coaching them on process. In addition, we instituted a Guided Design[8] called the nature of evidence, in which we presented early in the first semester a problem of low technical difficulty with a variety of possible solutions, none of which were obvious upon a first reading of the problem. In short, we tried to make it very difficult for them to jump to a solution. And, we have steadfastly graded their written work on the quality of the process revealed in their argument, as well as on the solution itself. To observe the students problem-solving processes, we asked students for frequent written and oral presentations.

In the fourth semester of the pilot program, we pushed students into better problem-solving techniques by giving them more difficult engineering problems to solve--problems proposed and directed by outside clients. The faculty, including the writing faculty, served as coaches and supervisors. During the fourth semester, we watched students struggle with their assignments, often overwhelmed by their difficulty because so many possible solutions had to be pursued. We helped them make crucial decisions by helping them recognize the need to limit their searches and to define their problems more narrowly if they were to have any hope of a solution within the allotted time. As a result, we watched them leave Multiplicity behind, for the most part, under the pressure of the problem-solving process. And, we have seen them gain confidence in their ability to argue persuasively in writing for their solutions, a confidence our seniors often lacked.

The Results

The EPICS writing faculty has observed a remarkable improvement in student writing ability. The reports that we received during the fourth semester were clearly superior to most undergraduate writing in the level of maturity with which students are able to argue a case. In fact, their writing at this stage, second semester sophomores, is more similar to the writing we have seen among young engineers in industry than among undergraduates. That means that their reports exhibit few mechanical problems and are generally well-formatted and attractive. There are still problems with argument and overall report design, but these are at a relatively high level. Not only has student writing improved dramatically, but most of the students feel confident about their ability to write.

What can we as writing teachers learn from this experience? We can learn that we have a much more central role to play in our students' education. We must credit our observations about the nature of their problem-solving abilities as these are revealed in student reports. These observations can give us an understanding of the cognitive processes students are using in their subject matter classes. We can challenge our colleagues in the technical faculty to share our observations and make their own by paying close attention to the processes revealed by work in their classrooms. As Marilyn Samuels said in her essay, "Possible Applications of Cognitive Science and Problem-Solving to Technical Writing," we can become engineering faculty, fully participating in educating future engineering professionals.[9] We can work alongside our technical colleagues in team-taught courses where technical problem-solving and communication go hand in hand. We can refuse to act as mere paper graders, a role we are often given by others who do not understand what we can do and too frequently by our own low opinion of our work. We can also refuse, at a very basic level, to allow ourselves to separate content from form just because we find ourselves teaching technical writing.

By involving our students in complex technical problems in their writing assignments, we give them a unique learning opportunity. They can learn to realize before 20 years of a failed career have passed that communication and problem-solving abilities are interconnected.

Footnotes

[1] Linda Flower, Problem-Solving Strategies for Writing (New York: Harcourt Brace Jovanovich, 1981), p. vii.

[2] Lee Odell, "Teaching Writing by Teaching the Process of Discovery: An Interdisciplinary Enterprise," Cognitive Processes in Writing, ed. Lee W. Gregg and Erwin R. Steinberg (Hillsdale, New Jersey: Lawrence Erlbaum Associates, 1980), p. 140.

[3] See Carol Lipson, "Books, Books, Everywhere, and Nary a Drop to be Found," in Proceedings of the Council for Programs in Technical and Scientific Communication (Pittsburgh: Council for Programs in Technical and Scientific Communication, 1982), pp. 2-11.

[4] References to the Colorado School of Mines' study of the future graduate are to an unpublished report, Profile of the Future Graduate, by W. Rex Bull, 1979.

[5] William O. Perry, *Intellectual and Ethical Development in the College Years: A Scheme* (New York: Holt, Rinehart and Winston, 1968).

[6] See Richard S. Culver and JoAnn T. Hackos, "Perry's Model of Intellectual Development," *Engineering Education* 73 (December 1982), pp. 221-226.

[7] Richard S. Culver, Michael J. Pavelich, and JoAnn T. Hackos, "Professional Projects for Freshmen and Sophomores: Going Beyond the Falling Egg," in *Twelfth Annual Frontiers In Education Conference Proceedings* (Columbia, South Carolina: IEEE, October 1982), pp. 275-280.

[8] Charles Wales, "Does How You Teach Make a Difference?" *Engineering Education* 69 (February 1979), p. 394.

[9] Marilyn S. Samuels, "Possible Application of Cognitive Science and Problem Solving to Technical Writing," in *Proceedings of the Council for Programs in Technical and Scientific Communication* (Pittsburgh: Council for Programs in Technical and Scientific Communication, 1982), p. 119.

"BREADTH AND DEPTH" FOR ENGINEERING AND SCIENCE STUDENTS: THE COMMUNICATION MINOR AT THE UNIVERSITY OF MISSOURI-ROLLA

SAM C. GEONETTA
ASSOCIATE PROFESSOR, SPEECH AND MEDIA STUDIES
UNIVERSITY OF MISSOURI-ROLLA

There has been a long-standing concern with the problems of communication faced by the engineer and the scientist. Recently this concern has become more pronounced.[1] Two factors have highlighted the reason for this concern. Now, as Hershner Cross of General Electric Company says, "Technology itself has become a part of the personal experience of every consumer, bringing the role of the engineer into universal sharper focus and making the profession of engineering more visible. . . ."[2] than ever before. Yet even though the technologist and his product are more visible now, his ability to communicate an understanding and appreciation of his product to the public has become apparently less effective. In a survey of recent engineering graduates, William R. Kimel and Melford E. Monsees forcefully conclude that "the most significant finding of the survey is that respondents overwhelmingly stressed the ability to communicate as most important, yet recent graduates--who will eventually take over as the leaders of our profession--are very deficient in this attribute."[3] In an attempt to alleviate some of these deficiencies a program to provide engineering and science students with satisfactory communication skills has been undertaken at the University of Missouri-Rolla. A twelve-semester-hour minor in communication integrates skills and the study of communication as a humanistic discipline.

The premises for the minor are: 1) a grasp of speaking, writing and media skills is essential to the rapid achievement of professional goals since an individual will engage in communication for increasing amounts of time as he progresses in his career and since communication competency and professional advancement are closely related;[4] and 2) skills must be integrated with an understanding of communication as a fundamental human activity.[5] By completing a course of study in such a program the student should have the skills to collect, analyze, and report on information about technology and its consequences. He also should understand communication as the activity that stimulates the understanding and acceptance or rejection of information, because he understands the human nature of communication.

The communication minor is administered in Speech and Media Studies. All students are required to enroll in Speech and Media Studies 181: Communication Theory. This three-semester-hour course provides an orientation to a range of activities in and theories about human communication. The course attempts to help the students answer the basic questions "What is communication?" and "What distinguishes human communication?" Topics range from communication from individuals in face-to-face situations to mass communication. While it is a survey course, it always focuses on communication as a humanistic activity. The student also elects nine additional semester hours from the following three-semester-hour courses (the course descriptions are in Appendix I): SPMS 85: Principles of Speech; SPMS 121: Design and Production for the Print Media; SPMS 101: Communication for Effective Meetings; SPMS 201: Photography: Theory and Practice; or SPMS 283: Business and Professional

Speaking; and English 160: Technical Writing; English 165: Engineer as Writer; or English 302: Advanced Composition.

The courses were selected for minor requirements for two major reasons. First, students should have a range of courses from which to choose depending on varying levels of ability and interest. For example, a student could focus on sharpening verbal abilities by enrolling in Principles of Speech, Business and Professional Speaking, and Technical Writing. On the other hand, a student with sound verbal abilities could have more breadth by electing Design and Production for the Print Media, Photography: Theory and Practice, and Business and Professional Speaking. Which courses a student decides upon are a product of consultation with his advisor to determine the student's abilities and interests.[6]

And second, students should get a focused program of study in a single discipline. This should help the student learn more about an area and should help him see the relationships between skills and ideas in that area. To achieve this, even the "skills" courses have a humanities orientation: the common thread running through all the courses is that communication is fundamental in defining man's humanity; communication is not just a set of rules or series of steps for giving speeches or writing papers. It is this orientation that provides a focus for the minor so that it is a unified disciplinary course of study rather than potpourri of courses.

Each student is assigned an advisor of his choice to help him select the courses for his minor. The advisor counsels the student about his interests, needs, and abilities. Usually, the student has completed two basic courses, including English 1: Rhetoric and Composition and English 60: Exposition. The advisor helps determine the courses that seem to be best for the individual based on an assessment of the student's work in the basic courses. Oftentimes the student has also enrolled in another of the courses in the minor to satisfy either a skills or humanities requirement and the advisor can assess the student based on the performance in this additional course. The advisor works with the student throughout the minor, keeping track of his progress and working with him on problems he may have.

With the advisor's counsel the student completes an "Application for Minor" (Illustration 1). Copies are signed by the advisor and the department chairman and sent to the major advisor, the Department of Applied Arts and Cultural Studies (parent department of Speech and Media Studies), the Registrar's Office, and the minor advisor. The application and its distribution serve as a fail-safe device; individuals responsible for the student's satisfactory academic progress are alerted to a special course of study the student has chosen. Any one of them can make recommendations on either the advisability of the minor for the student or the particular courses the student has chosen. Additionally, the application serves to notify the Registrar's Office of an important graduation checkpoint since the student who successfully completes the minor has it entered on his transcript. The application is not a contract and the student may abandon the minor at any point without penalty.

Typically, students work to achieve a balance of skills and humanities in their minor schedules (Table 1), although skills courses attract the largest number of students because of the demand for such skills in professional positions and because of student awareness that proficiency in skills is correlated with professional success.

Illustration 1

Application for Minor

Date____________

Student's name______________________________ Student number___________

Minor field________________________ Major field______________________

Minor advisor______________________ Major advisor____________________

Courses planned for minor	Cr. Hrs.	Semester	Completed

Anticipated completion date of minor________________________________

Anticipated date of graduation______________________________________

Minor advisor must initial any courses requiring special permission and any substitutions for courses planned.

Minor advisor____
date

Dept. Chair____
date

Table 1

Enrollments in minor courses***

Course Title and Number	Enrollment
English 70: Creative Writing*	25
SPMS 85: Principles of Speech	101
SPMS 101: Communication for Effective Meetings**	6
SPMS 121: Design and Production for the Print Media**	8
English 160: Technical Writing	90
English 165: The Engineer as Writer	49
SPMS 181: Communication Theory	129
SPMS 201: Photography: Theory and Practice**	9
SPMS 283: Business and Professional Speaking	65
English 302: Advanced Composition	15
English 305: History and Structure of the English Language*	6
English 306: Linguistic Study of Modern English*	6

*These courses were dropped from the minor in 1980 because they did not fit the concept of "applied communication" for professionals promoted in the minor.

**These courses were added in 1980, 1981, and 1982.

***The courses Engineering Management 211: Industrial and Organizational Management; Engineering Management 265: Personnel; and English 60: Exposition were allowed as minor electives for a small number of students because the courses suited their abilities and needs better than other electives and because the students had demonstrated a good grasp of basic skills and concerns. Twelve students elected EM 211, one elected EM 265, and five elected English 60.

From the Fall, 1977 semester, when the minor became a fully active program, 129 students have enrolled in the program. Of these, 106 have been from engineering and the sciences and 23 have been from the humanities and social sciences (Table 2).

Table 2

Academic Majors of Communication Minors

Engineering and Science

Aerospace	2	Geological	2
Ceramic	1	Geophysics	1
Chemical	3	Life Science	1
Civil	12	Mechanical	10
Computer Science	35	Metallurgical	6
Electrical	13	Nuclear	2
Engineering Management	12	Petroleum	3
Engineering Mechanics	1	Physics	1

Humanities and Social Sciences

Economics	7	History	2
English Literature	13	Psychology	2

The number of students enrolling in the minor in communication has grown steadily from nine in 1977-'78 to fifty in 1982-'83. Sixty-two students have graduated with the minor completed into positions with companies ranging from Hallmark Cards to Phillips 66. Their work has invariably required that they utilize extensively their communication skills and in some cases the minor has been a strong contributing factor in their being chosen for a position. Since this is the sixth year of the minor a survey of graduates will be taken to assess the content and the impact of the program objectively. The visibility of the communication minor has also had a secondary effect: while not all students can complete the twelve hours required for the minor--mainly because of the tight schedules in most engineering and science curricula--increasing numbers of students are enrolling in communication courses. In 1977-'78 there were 189 students in communication courses, while there were 585 in 1982-'83. Overall, students at the University of Missouri-Rolla are working to become better communicators both to enhance their professional lives and to enhance their professions. The communication minor was implemented to help them achieve these goals and, at least up to this point, seems to be effective. Designed for engineering and science students with tightly structured schedules of classes, it is an effort to build communicative competency while giving breadth and depth in a single area of study.

Appendix I

Communication Minor Course Descriptions

SPMS 85: Principles of Speech. A study of the arts of expression, oral communication and listening (theory and practice); effective interaction of speech, speaker, listener, and occasion.

SPMS 101: Communication for Effective Meetings. A study of the elements that make meetings function well. Includes the examination of factors that effect meetings and parliamentary procedure.

SPMS 121: Design and Production for the Print Media. The exploration of language through the study of the development of the elements of typography and editing. A study of the development of editorial principles and styles to understand how editors reach decisions to help students achieve a critical sense in dealing with the print media.

English 160: Technical Writing. The theory and practice of writing technical papers, reports and correspondence (prerequisites: English 1: Rhetoric and Composition and Junior standing).

English 165: Engineer as Writer. A study of Vitruvius, Frontinus, Abbot Suger, Theophilus, Biringuccio, da Vinci, Eads. Their projects evaluated according to technical, aesthetic and symbolic criteria. Special emphasis on their contributions to western civilization. Interdisciplinary. (Prerequisites: English 1: Rhetoric and Composition).

SPMS 201: Photography: Theory and Practice. The course is an introduction to photographic communication. It includes a study of basic camera controls, black and white film and print processing, the use of 35mm and larger format cameras, and photographic history and aesthetics.

SPMS 283: Business and Professional Speaking. This course focuses on the professional oral communication such as the technical speech, business-type briefing, or informative report. The student learns about language in oral communication and manuscript preparation, preparation of effective audio-visual devices, microphone speaking, and similar topics. (Prerequisites: English 60: Exposition or Speech and Media Studies 85: Principles of Speech).

English 302: Advanced Composition. Instruction and practice in writing expository essays of substantial content and skill, with particular emphasis on the rhetorical applications of recent findings in language research. Papers required will include critical essays on literary works and library research. (Prerequisities: English 60: Exposition or English 160: Technical Writing).

NOTES

1 A sample of articles that have addressed themselves to this issue includes Robert G. Redelf, "A Curriculum for Tomorrow's Extractive Industries," *Journal of Metals* (February 1979), pp. 32-34; Irwin Berman, "Communications and the Engineering Environment," *Mechanical Engineering* (August 1978), pp. 24-28; and Gardner W. Stacy, "Basic Communication Skills Crucial for Successful Professional Careers," *C&EN* (September 18, 1978), pp. 29 and 46.

2 Hershner Cross, "A Critical Confluence from Graduate to Entry-Level Engineer," *Engineering Education* (November 1978), p. 197.

3 William R. Kimel and Melford E. Monsees, "Engineering Graduates: How Good Are They?", *Engineering Education* (September 1979), pp. 210-212.

4 See John E. Baird, Jr., *The Dynamics of Organizational Communication* (New York: Harper and Row, 1977), Chapter 1.

5 The minor is designed to go beyond simply helping the students raise their level of skills. It is also designed to help the students get some depth through the integrated study of communication as a humanistic discipline. An excellent discussion of this rationale is set forth in Paul E. Torgersen, "Engineering Education and the Second Obligation," *Engineering Education* (November 1979), pp. 169-174.

6 Students may also elect an "interdisciplinary" communication minor in which they take three semester hours in an area other than Speech and Media Studies or English. These students are relatively rare and include primarily individuals who are interested in what is called "organizational communication"--communication within large, usually complex organizations--and management. Since the Speech and Media Studies curriculum currently has no course in this area students have been opting for a course which I have reviewed called Industrial and Organizational Management in the Engineering Management Department. In addition to an interest in organizational communication, these students have to demonstrate basic abilities in communication.

PLANNING A TECHNICAL WRITING PROGRAM AT KANSAS TECHNICAL INSTITUTE

DALE SULLIVAN
ASSISTANT PROFESSOR
KANSAS TECHNICAL INSTITUTE

Here at Kansas Technical Institute, we have begun looking into the feasibility of starting a technical writing program.

Kansas Technical Institute is a two-year technical college offering associate degrees in mechanical, civil, electronic, computer, chemical, aeronautical, and general engineering technology. Our technical writing degree would be a general technology degree with emphasis in communications and one of the above specialized fields.

We first decided to begin work on such a program after visiting Boeing Military Airplane Company and NCR in Wichita (90 miles south of Salina, where KTI is located) during January interterm, 1983. We learned that there is a strong demand for technical writers and were encouraged to begin working on a technical writing program. For instance, the head of the tech writing department at Boeing said he would be hiring an additional 100 writers this year.

Since that time, we have worked up a tentative classification of courses for the program. Students would be expected to complete 23 semester hours in communications courses, six in business or humanities, 11 in math, eight in science, and 20 in a particular technology. A complete list of the courses is included at the end of this report.

We have also been busy getting information from other schools that offer technical writing courses or degrees. This year's meeting of the

CPTSC was especially helpful in this endeavor, as we learned about programs already working and got a list of people who might be able to give us information about their programs and courses. With the information gathered from these sources we hope to come up with a selection of courses commonly taught and feasible for our particular school.

During the coming year, we plan to do several things. First, we want to write up course descriptions for the communication classes we would be adding to our curriculum. Then we will select courses from the technologies and compile a list of courses the student should take in each technology. Also, since KTI is quite small and technology courses are offered only once a year, we will need to work out a flow chart for the program as it relates to the various technologies. This coming fall, we plan to take our proposed degree program to Wichita and show it to several professional writers who have agreed to serve as advisors. Any adjustment suggested at that time will be worked into the plan before our final step.

Once we have a program outline that looks good to industry and feasible to us, we plan to submit it to our school's course and curriculum committee and to our administration. Since, the program would be an option within the general engineering technology degree, we will not have to submit it to the Kansas Board of Regents. We hope to have the program accepted sometime during the fall semester, 1983.

When we have the program accepted, we will then have at least one semester to begin recruiting work. We hope to visit several area high schools, talk to English classes, and suggest that students can find jobs as technical writers. We also think that we may be able to recruit students from college English departments who have found out that their English degree is not opening any employment opportunities.

Finally, next spring and summer would be given to developing course syllabi, choosing text books, and hiring an additional faculty member. We also plan to open a work room with [illegible]le computers available for students' use as word processors. Students for the new program could start work as early as fall 1984.

This schedule may be overly optimistic. If there is a slow down, it will probably occur next fall when we work with industry and our school's administration. If that happens, we plan to take an extra year and spend more time collecting data about the demand for technical writers and about the contents of courses offered in other schools. In that case, we would plan to have the program accepted by the school in the fall of 1984 and begin offering classes in the fall of 1985.

We believe, however, that the combination of a strong background in a specific technology along with several courses in technical communications will give our students the competitive edge they will need in today's industry.

Below is a tentative classification of courses recommended as a course of study to obtain a General Technology degree with an emphasis in Technical Writing.

REQUIRED COMMUNICATIONS COURSES

Oral Communications	2/0
Written Communications	3/0
Technical Writing	3/0
Total	8/0

ELECTIVE COMMUNICATIONS COURSES REQUIRED FOR T.W. EMPHASIS

Adv. grammar, tech. style	2/0
Organizational Comm.	3/0
Writing Persuasion	2/0
Information Writing	2/0
Internship	4/0
Instruction Writing	2/0
Total	15/0

BUSINESS AND HUMANITIES ELECTIVES

Literature and Technology	3/0
Introduction to Business	3/0
Total	6/0

REQUIRED MATH

College Algebra	3/0
Plane Trigonometry	2/0
Analytical Geometry & Calculus	4/0
Differential Equations	2/0
Total	11/0

REQUIRED SCIENCE

Chemistry I	3/1
Technical Physics I	3/1
Total	6/2

ELECTIVES IN TECHNOLOGY	20 hrs.
Total	68 hrs.

A CONTEMPLATIVE VIEW OF TECHNICAL WRITING

CAROL LIPSON
ASSISTANT PROFESSOR, ENGLISH DEPARTMENT
SYRACUSE UNIVERSITY

At CPTSC, we are used to hearing discussion of programs being planned or implemented, courses under development or modification; from me, you will hear something slightly different. At Syracuse, this has been a year of contemplation. Let me first describe what such contemplation has yielded insofar as our own program is concerned, and then move on to contemplations yielding more general implications.

First, I was forced into some of my contemplation by circumstance. A resignation by a responsible staff member in our freshman composition program, and a negative tenure decision on our composition theorist, who was responsible for the upperclass and graduate levels of composition courses, left us with an opportunity to plan a new focus to our composition program, with two core positions available at once. I was head of the search committee for the theory position, and on a three-member subcommittee of the executive committee charged with developing models for restructuring the Freshman English administration. I was thus handed the opportunity to carefully examine the writing program and propose changes that could benefit it. I could recommend, for instance, that we create an area of strength in the department by complementary hiring for the two positions. While I could in no way recommend hiring two technical writing experts for these positions, or even one, I could try to determine what types of focuses could enhance our entire writing program, including technical writing.

Let me point out that our writing faculty is small, consisting only of the Freshman English director, the composition theorist, myself, and three English as a Second Language faculty: only six people, with just three for native English speaking students. Increasing the faculty in composition was clearly something I favored, and the executive committee unanimously voted in favor of replacing the staff member with a faculty member early in the deliberations. But a faculty member with what duties and responsibilities? Of what expertise? With what relationship to the faculty member we were already replacing? That was the question.

I won't take you through the details of my contemplations, but I will tell you about our subcommittee's favored model. We decided that our TAs and part-timers would benefit greatly if we gave them the opportunity for study and practice in composition research, and in applying a variety of pedagogical techniques and approaches beyond the ones in place currently in Freshman English. If our PhD students could graduate with a core of courses in composition and rhetoric -- courses in history and theory and pedagogy, which we already have; courses giving special focuses such as technical writing and ESL, which we also already have; and research methods courses, which we don't have -- and if they could also graduate with some research studies completed, some publications to their names, they would have a much easier time getting jobs. Clearly if we created PhD programs in composition and technical writing, they'd do even better, but we couldn't be that ambitious at the moment.

100

Our decision then was to focus on composition research. Our first hiring in that area, for the upperclass and grad level position, is complete; our new faculty member will arrive this summer. Our plan for the second position needs approval by the new executive committee that just took over, and then by the Dean since it involves converting a staff position to a faculty one. That will take longer. But here's what we have in mind: the two new composition research experts would take turns teaching a course on composition research methods with a strong component on applications to pedagogy. A followup course would offer internship experience. TAs and part-timers would, under the supervision of one of the two, teach a writing course they designed -- a research-based course. One of the new faculty members would take charge of such a course at the Freshman level (where we do have a small technical writing offering), and one would supervise research-based courses in advanced composition as well as in technical writing.

I'm excited by the prospect of the intellectual stimulation and the pedagogical stimulation that such a composition research group could bring to our writing program, including to the technical writing program. Half of such a composition research group will be in place in the fall. Whether we get the other half remains to be seen; I'll report next spring on the results. I anticipate this approach will enliven our technical writing program, and will make the teaching activities a fascinating experience. I think the students will benefit. I think it means you'll be hearing exciting things from the technical writing program at SU. Given that I couldn't recommend hiring a technical writing colleague, I believe this plan serves the technical writing program as well as I could hope. Perhaps other schools represented here would want to consider such a model. I've already been asked whether we could indeed find such faculty. The answer is yes. We found one, working on the theory of composition research, and hired her. We also interviewed another who was very well prepared for leading such an effort.

Let me also add briefly that my contemplation led me to try to do something to ease the enormous workload of upperclass technical writing and expository writing teachers. Our university provides excellent free tutoring for freshman students with grammar and style difficulties. There is no tutoring for remedial upperclass students, but we are finding more and more remedial upperclass students, many of them transfers. We teach students from the SUNY College of Environmental Sciences and Forestry, and they all enter as transfers. I tried to find some way to take care of the remedial problems.

What I did was write a grant proposal last summer, to purchase interactive teaching software for our main campus computer. The proposal was funded, and we now have a grammar program (from the University of Michigan), an invention program (from Hugh Burns at the Air Force Academy), and we are waiting for a style program from UCLA and some others. We're in a long line-up at the computing center to get these programs functioning, so I can't yet report any results. Next year I'll let you know if we have found the computer a useful teaching tool or not.

Now let me move away from consideration of our particular program, to some contemplations about technical writing in general. Such contemplation is not the norm for a CPTSC report; we are used to hearing about programs being developed, courses, pedagogical techniques, and industrial practice. I'd like to look at some of the trends and tendencies that have been prominent in practice and pedagogy in our field, and to consider what the implications are for our future discussions of programs and pedagogy. This is thinking in progress; I will raise lots of important questions, though I cannot really provide answers yet.

The major trend I wish to examine today is one in which studies of practice -- by that I mean studies of writings in the technical communities -- generate descriptions of practice which become widely accepted as normative for future writings. I begin my examination with the beginnings of the academic field of technical writing, with the beginnings of a body of scholarship in the field. Though writing on scientific and technical subjects has taken place since ancient times -- the earliest I've found have come from Ancient Egypt -- yet the academic field of technical writing, and the designation technical writer, are really phenomena dating from the period following the second world war, with the growth in technology and the growth of writing about technology. The task of writing considerable amounts was not one engineers and scientists had received preparation for, and academia was called in to address the issue and solve the problems.

Clearly English faculty teaching such courses had to first find out the nature of the beast before they could with any degree of credibility teach students and professionals how to harness it. The first theory of technical writing arose out of such an effort, in the early 1950s [1]. Gordon Mills and John Walter, at the University of

Texas, studied reports and scientific papers from over 300 companies and research organizations. From this massive analysis, they compiled a set of characteristics common to the samples they examined; these they then delineated as definitive elements of technical writing: they pointed to the fact that technical writing uses standard forms, is objective, impartial, concise, plain, etc. In their theory, they quite consciously turned their description into prescription. What they had found to be so in past practice, they made normative for future practice.

Now such a reliance on practice for norms -- for construction of a theory or set of principles and laws -- will inevitably be founded upon underlying assumptions. Here these assumptions seemed to be that the world of practice out there is real and true and good, and that it is our job to study it inductively to try to understand its rules, its nuances, and to teach our students to reproduce it. Certainly linguists follow such assumptions in studying and teaching foreign languages. Our colleagues in foreign language departments have been doing just this for years; there is clearly precedent in the humanities for this approach to studying and teaching language use.

While Mills and Walter, in creating their early theory, were among the first to use this approach in technical writing, they are by no means the last. Looking to practice for rhetorical norms continued through the 60s and 70s as a common approach in the field. For instance, Edmund Dandridge of North Carolina in the early 70s published a study of grammatical and style characteristics of technical writing, and once again the description turned into prescriptive principles [2]. He found that technical writings are characterized by short sentences,

104

short paragraphs, simple sentences. These characteristics were distinctly presented in the study as defining characteristics of technical writing; indeed the title of the paper is "Notes Toward a Definition of Technical Writing."

Even Kinneavy's theory shares this approach. Kinneavy's is the only comprehensive general theory of discourse to treat scientific writing to any significant degree [3]. While the main thrust of Kinneavy's theory is that discourse can profitably be classified according to a limited number of aims, independent of characteristics of the discourse, yet the secondary thrust is to analyze the characteristics of major types of discourse representing these aims, and to provide theoretical explanations for these characteristics. These characteristics are delineated as distinguishing features of that type of prose. The main thrust of the discussion renders the delineation prescriptive.

I will not attempt to be comprehensive in citing the examples of theoretical principles formulated upon acceptance of practice as normative. Let it suffice for me to cite, as a final exemplar of this trend, the advice given by a major figure in the technical writing field. In 1977, Dwight Stevenson argued that the only valid way to generate a rhetorical theory for scientific and technical communication was through an analysis and characterization of practice [4].

Let me point out that even many of the studies advocating change from practice based their arguments on data gathered from the practical world -- data on opinions, needs, likes, and dislikes of readers of technical documents (Souther, Mathes and Stevenson, and Kirkman). Thus the world of practice has been relied upon to formulate guidelines for changes in practice. Clearly a proper inductive study, following scientific method, would be an effective way to convince a scientific audience. There is a sound rationale for such a tendency.

Now let me also point out that from the start of the academic discipline of technical writing, voices have been raised to counter the adherence to practice that formed the main trend of the field [5]. Those doing historical studies have tended to point out the relativity and recency of the present conventions and have often pointed to the existence of more humane or aesthetic alternative conventions existing in prior periods [6]. And there were also voices raising theoretical questions about the conventions of practice. The major approach in such theoretical discussions was to apply epistemological developments in fields such as history or philosophy of science to discussions of scientific prose. Einstein's work in relativity focused attention on the importance of the knowledge seeker's frame of reference, or point of view. Heisenberg's work focused attention on the inevitable effect of the observer on the observed: on the limitations of what the observer could learn. Kuhn's work in The Structure of Scientific Revolutions and Ziman's in Public Knowledge showed quite clearly that scientific research is a communal activity, and that the choice of paradigm or theory is a communal choice. Once the choice is communal, considerations other than objective scientific ones can play a part. The best theory will not always be the one chosen; indeed historically, it has not always been chosen (See the Beadles' article on Mendel in the Bowen anthology, Writing About Science). Polanyi's argument for a large personal element in scientific understanding, countering the picture of a scientist with a strictly objective stance, has also been cited.

The theoretical discussions following this line of thinking concluded then that if the scientific activity of knowledge seeking is a communal, consensual, somewhat personal one rather than a strictly objective activity, that is if the knowledge-seeking is not strictly objective and impersonal, then the ideological grounding for scientific writing practice rests on a faulty base, and is thus faulty itself. Thus such theoretical studies frequently either directly advocated changes in style, or at least led others to advocate such changes -- to prose that acknowledged the personal and social nature of the activity. These arguments were used to favor a loosening of shackles that constrained scientific prose to a voiceless, personless domain. Let me cite Merrill Whitburn, Phil Rubens, Carolyn Miller, Lisa Barton, and Michael Halloran as the major voices initiating such theoretical directions of thought in the field [7]. For the influence on a movement for style change within the field, see for instance Alvarez' guidebook, The Elements of Technical Writing (1980).

Thus what we find in examining the trends of research in technical writing is that for quite a long period, we had a group of researchers doing scientific-type inductive studies of practice, generating theoretical principles from what was found to characterize the world of practice. Another group, much smaller, applied theoretical understandings from other disciplines to test technical writing practice, and many times found it wanting. These applications of humanistic theoretical approaches tended to focus attention on the desirability of a direction away from established practice. Need I say that they have not had an overwhelming, and often even significant, effect on practice or even on textbooks in the field.

Let me quote from a 1982 text that recently appeared: it's Anne Eisenberg's recent text, called Effective Technical Writing, and it epitomizes a practice-based prescription. It explains that scientific writing is (and thus must be) objective, with no intrusion of the author, in short simple sentences; that scientific writing avoids the language of daily life, uses it only as a last resort; that less is better in scientific writing; that examples and explanations are used sparingly, that the prose tends to be undecorated; that the language is austere; that figurate language is infrequent; that the narrative voice hardly occurs; and that the speaker is shoved firmly in the background. That is, we get norms abstracted from practice, ones not very different from Mills and Walter's 1950s set of characteristics.

As is evident then, not only have the theoretical studies had little effect in moving the field from established practice, I find it extremely significant that some of the newer theoretical studies are now providing grounding to move us in the opposite direction -- back closer to practice. For instance, Lisa Barton of the University of Michigan a year ago presented an argument at CPTSC that countered the standard post-positivist stance [8]. This stance holds that since science is a communal activity, since scientific theories or methodologies are consensually approved or rejected -- sometimes erroneously -- then science is not an objective activity and cannot be making a truth claim; it offers only persuasion based on socially adopted constructs. Lisa Barton argued, based upon Gerald Graff's 1979 book Literature Against Itself, that our post-positivist theorists have gone from the extreme of practice to an entirely opposite extreme, that they have thrown out the baby with the bath water. She argued that scientific discourse does make a truth claim, that just because the scientific activity is not 100% objective does not mean that it is preponderantly subjective or arbitrary. I agree. But this means the epistemological objection to the objectivity of science and science writing is now removed, an objection voiced by Halloran and Miller, among others. We then lose much of the force of the argument against the need for the prose to reflect objectivity.

Other recent theoretical studies in the field also lead us back closer to practice. Carolyn Miller, in her Ethos article and in a 1983 CCCCs presentation [9], and David Dobrin, in his College English article [10], are both working with the notion of rhetorical communities and with the existence of distinct rhetorical conventions for each of those communities. I find this a compelling direction for research, one I have pursued independently. According to my reading, which I will discuss in an article to be completed in the near future, the thrust of the work of the last fifteen to twenty years in literary theory and communication theory and sociolinguistics seems to have been to show the importance of context on communication, to show the cultural relativity of communication conventions, the power of appropriate handling of a community's communication conventions for appropriate receivership of the discourse in that community. As Michel Foucault and others have shown, the scientist must sound like a scientist to be accepted as really belonging to the community.

In taking further the concept of rhetorical communities, in investigating the relationship of this concept to technical writing, it becomes quite clear that one can no longer look at the field of technical writing as encompassing one set of language norms for its many subfields. We can no longer say that the norms are the same as long as the discourse conveys precisely and economically one meaning. Instead, we now see a set of rhetorical communities, each with its own rhetorical conventions and norms. For instance, the norms for research scientific writing are very different from the norms for the business rhetorical community, and those are very different in turn from the norms for the legal rhetorical community, and those in turn differ from norms for the non-research technological community [11].

In past technical writing pedagogy, the norms for the scientific community have often been abstracted and taught for other groups. The recent book by Anne Eisenberg (1982) entitled Effective Technical Writing bases its style advice on analysis of scientific writing, rendering past practice normative for scientific writing but also for the writing non-researching engineers will have to do. Yet the two groups have different types of writing, different purposes for writing, and different conventions for the writing (See McCarron and Dobrin).

The rhetorical communities issue is not the only one raising troubling questions for technical writing teachers, questions having to do with the relationship between the world of practice and the world of pedagogy. The same problems occur in certain attempts to determine writing processes. Recently I heard a talk by Lee Odell, by all accounts an expert in research methodologies who conducts research in industry. He reported on his studies of the writing processes of government workers (See the published version in the New Essays anthology edited by Anderson et al). Odell's talk focussed on the premise that if we find writers in industry following this or that process, we should teach students to do the same. If writers in industry asked certain types of questions in generating documents, we should teach students to ask those questions.

Other handlings of the writing process issue base themselves on similar premises; a few proposals of that sort were submitted to me for MLA panels. The premise is this: the world out there knows how to do things and serves as model for us to follow. The real problem here is that no justification is provided that the quality of the writers' products or the quality of their processes merit their being raised as models, or that the notion of enculturation to communities must involve imitation of writing processes. We hear details about what particular people are doing in their processes without any justification that they are or should be representative. Few would think of taking these same random people and examining their eating behavior and then making recommendations for college students to eat like that. Yet studies of writing do at times make such conclusions and recommendations. We need, in fact, to be very cautious about interpreting and applying results of process studies of workers, just as we need to be very cautious about interpreting and applying analysis of the products of those workers. How far do we take the notion of enculturation?

A basic question at issue here is 'what is our role?' Are we technicians who create clones? Or to give us a higher status, are we genetic engineers seeking the techniques and understanding necessary to create such clones? Is our function purely reproductive of practice? Are we social scientists who study language cultures, who determine their characteristics, and who pass these on to students and guide students in adapting themselves to such language use? Are we such non-intrusive facilitators? Or do we perhaps have a function as advisers of productive change? Should we attempt to influence and alter practice?

Furthermore, do our programs exist to provide skills so someone can exactly fit into a job situation having been given all the training needed, including nuts and bolts stuff? That is, are we a trade? Do we, for instance, have to teach students how to dictate so their secretaries can type easily from the tapes, and so the students won't have to do a second draft, or even so they'll get adept at dictating? Some say so. Do we teach them to use word processors and to use editing programs, because companies have them and the students will have to use them later? Again, some suggest this. As coordinator for the ATTW MLA programs, I've just read about 20 proposals telling me we should do these things. I read not one telling me, for instance, that research on the brain shows speaking aloud to be a useful prewriting tool because of the simpler cognitive processes involved. I would have been much more convinced by that rationale than by the ones offered: that the workers out there in industry do it, so we should teach it.

Our relationship with practice in the real world is a delicate one. We probably won't survive as consultants, freelancers, and contacts for students if we become revolutionaries. But we can honor and teach conventions of practice and still question the validity of practice and the validity of introducing procedures from practice into our pedagogy.

We have come of age, and can and should stand on our own, respectful of but not subservient to practice.

An irony of course is that academia was brought into the field precisely because practice was faulty. Many of us in the field have been called in as consultants by industry to work with various rhetorical communities. Admittedly, we often find the practitioners are writing inappropriately for the community they are addressing. They're handling conventions inappropriately. But I myself have found at times that the practitioners are following the norms of their rhetorical community and following them well. And that's the problem. The readers do not find these norms readable, and I am called in to loosen the bonds of practice -- to change the norms by which these communities practice.

Thus it goes without saying that I am uncomfortable with theoretical justifications for codifying and deifying what might simply be faulty human constructs. And yet, we cannot turn our classrooms into missionary societies, or indoctrinate our students in revolutionary approaches that will get them in trouble in their rhetorical environments, which are frequently very conservative. In the service courses we teach, we are preparing professionals for writing in their professional worlds. By the nature of our field, our relation to the world of practice is a delicate one.

A further implication of the rhetorical community analysis is to question the suitability of teaching service classes of professional writing to heterogeneous groups representing different rhetorical communities. Most courses, and many programs, are heterogeneous in nature. Often some generalized form of language use is taught, extrapolated across all fields. I am finding this practice indefensible, for to properly teach these groups to accommodate to their own conventions, one winds up teaching five courses in one. The main advantage to the heterogeneous group is the built-in availability for each group of an audience outside the group, to practice that sort of communication mode. But communicating outside one's rhetorical group is only a portion of one's professional communication, for research scientists indeed a very small portion. The viability of the heterogeneous grouping in service classes remains a serious question.

And the other issue I've raised, as to the funtion of the technical writing academician, is also a question that bears examination. Though my investigation is far from complete, I'd venture to say that theoretical analyses have brought us virtually full circle, back to teaching the conventions of practice. But not as absolutes. We should, I believe, teach the conventions as the social constructs they are, and to teach the ideologies that lie at their foundations, to make students very conscious of the limitations of the ideologies, conscious of the relativity of the constructs and of the effect of the constructs, and of the effect of violating these constructs. If we can also make them conscious of the sound of prose, of the effects of prose on readers and of how it elicits these effects, and of what is happening in the reader-text interaction, we will perhaps have laid the groundwork for a slow sequence of changes and improvements in the prose of their rhetorical communities. From my analysis to date, it's hard to come by theoretical justifications for teaching students to drastically violate conventions, though theoretical discussions of drastic changes --

whether epistemologically or ethically or otherwise grounded -- are entirely appropriate in research discussions.

Thus my feeling at this point of my study is that technical writing academics can and do play a role ultimately as advisors and directors of change in rhetorical practice, but our pedagogy cannot veer very far from conventions of writing practice. But I am not convinced that this means we must teach conventions of writing processes we find in industry, or mastery of equipment common for writing in industry. But I'm open to arguments: this is still contemplation in progress.

Notes

[1] Mills and Walter, The Theory of Technical Writing, Circular No. 22, University of Texas Bureau of Engineering Research.

[2] Edmund Dandridge Jr., "Notes Toward a Definition of Technical Writing," Journal of Technical Writing and Communication 3, 1973, 265-271.

[3] J. Kinneavy, A Theory of Discourse, 1971.

[4] D. Stevenson, "Toward a Rhetoric of Scientific and Technical Discourse," The Technical Writing Teacher 5, Fall 1977, 4.

[5] This work was presented before the release of the anthology edited by Anderson, Brockmann, and Miller containing some of the most

significant work in the field in recent years. It thus cannot reflect the papers included in the anthology. The author had access to only a few of the papers through personal correspondence.

[6] See for instance John Brogan, "Lessons from Benjamin Franklin: America's First Great Technical Writer," IEEE Transactions on Engineering Writing and Speech; Steven Gresham, "Benjamin Franklin's Contributions to the Development of Technical Communication," Journal of Technical Writing and Communication 7, 1977, 5-13; Michael Halloran, "Eloquence in a Technological Society," Central States Speech Journal, 29, 1978, 221-227; Carol Lipson, "Descriptions in Medieval Times: Lessons to be Learnt from Geoffrey Chaucer's 'Treatise on the Astrolabe'," Journal of Technical Writing and Communication 12, 1982; Walter James Miller, "What can the Technical Writer of the Past Teach the Technical Writer of Today," in The Teaching of Technical Writing, edited Cunningham and Estrin, NCTE, 1975, 198-216; Elizabeth Tebeaux, "Franklin's Autobiography: Important Lessons in Tone, Syntax, and Persona," Journal of Technical Writing and Communication 11, 1981, 341-349; and Merrill Whitburn, "The Past and the Future of Scientific and Technical Writing," Journal of Technical Writing and Communication 7, 1977, 143-149 as well as "The Plain Style in Scientific and Technical Writing," Journal of Technical Writing and Communication 8, 1978, 349-358.

[7] Lisa Barton, "What is Technical Writing? Prolegomenon to a Contextual Definition," in Technical Communication, NASA Conference Publication Part 1, edited J. Mathes and T. Pinelli, p. 3-13.

Michael Halloran, "Technical Writing and the Rhetoric of Science," Journal of Technical Writing and Communication 8, 1978, 77-88.

Carolyn Miller, "A Humanistic Rationale for Technical Writing," College English 40, February 1979, 610-617. Miller's article did not explicitly advocate that we teach students to violate conventions. But it was interpreted by many that way, since it did establish that the justification for impersonality (and of the consequent passives) is the positivist epistemology (p. 614) and that the positivist epistemology is no longer viable. Miller did not directly address the issue she raised.

Phil Rubens, "Technical Communication: Notes toward Defining a Discipline," NASA Technical Memorandum 81966, March 1981.

Merrill Whitburn, "Personality in Scientific and Technical Writing," Journal of Technical Writing and Communication 6, 1976, 299-306.

[8] Ben and Marthalee Barton, "How not to Theorize about Technical Discourse: The Lesson from Literary Theory," Proceedings CPTSC 1982, 130-140.

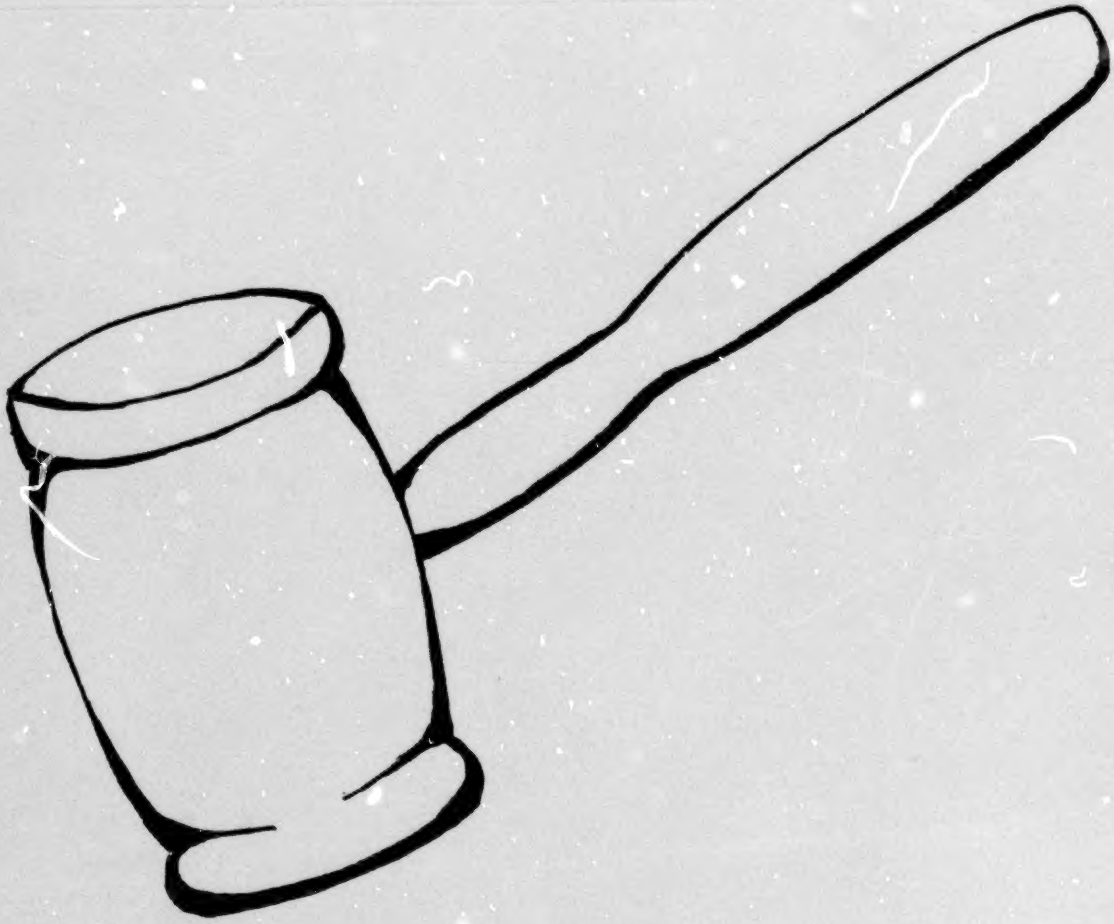
[9] Carolyn Miller, "Technology as a Form of Consciousness: A Study of Contemporary Ethos," Central States Speech Journal 29, 1978. Also "Meaning, Reasoning, and 'Fields of Argument'," CCCC Presentation, March 18, 1983.

[10] David Dobrin, "What's Difficult about Teaching Technical Writing," College English 44, February 82, 135-40.

[11] Ibid, and also Dobrin, "What's Technical about Technical Writing," New Essays in Technical and Scientific Communication: Research, Theory, and Practice, edited by Paul Anderson, John Brockmann, and Carolyn Miller, Baywood Press 1983, 227-250.

James Grimshaw and William McCarron, "Hidden Persuasions in Technical Writing," The Technical Writing Teacher 9, Fall 1981, 19-22. Note that articles previously cited by Halloran and C. Miller provided the first appearances in the field of the ideas of rhetorical communities with differing conventions.

ANNUAL BUSINESS MEETING



PARTICIPANTS AND GUESTS IN 1983

Virginia A. Book
Agricultural Communications
University of Nebraska-Lincoln
Lincoln, NE 68583-0918
Office: (402)472-3034

Laura E. Casari
Agricultural Communications
University of Nebraska-Lincoln
Lincoln, NE 68583-0918
Office: (40[illegible])472-3033

Beekman W. Cottrell
Department of English
Carnegie-Mellon University
Pittsburgh, PA 15213
Office: (412)578-2867
578-2850

Margaret Duggan
Department of English
South Dakota State University
Brookings, SD 57006
Office: (605)688-5191

Sam C. Geonetta
Speech and Media Studies
University of Missouri-Rolla
Rolla, MO 65401
Office: (314)341-4697
341-4185

JoAnn T. Hackos
Comtech Services, Inc.
133 S. Van Gordon St.
Suite 206
Denver, CO 80228
Office: (303)986-9534

Laurie S. Hayes
Department of Rhetoric
217 Haecker Hall
University of Minnesota
St. Paul, MN 55108
Office: (612)376-4720
373-0917

Anne L. Johnson
Agricultural Communications
University of Nebraska-Lincoln
Lincoln, NE 68583-0918
Office: (402)472-3032

Judith Kaufman
Department of English
Eastern Washington University
Cheney, WA 99004
Office: (509)359-2811

Patrick M. Kelley
Department of English
New Mexico State University
Box 3E
Las Cruces, NM 88003
Office: (505)646-3931
Home: (505)523-6357

Carol S. Lipson
Department of English
401 Hall of Languages
Syracuse University
Syracuse, NY 13210
Office: (315)423-2071
Home: (315)446-3779

Raymond MacKenzie
Department of English
Mankato State University
Mankato, MN 56001
Office: (507)389-1166

Gerald Parsons
Agricultural Communications
University of Nebraska-Lincoln
Lincoln, NE 68583-0918
Office: (402)472-3032

Joyce T. Povlacs
Teaching and Learning Center
1220 Seaton Hall
University of Nebraska-Lincoln
Lincoln, NE 68588
Office: (402)472-3079

Marilyn Schauer Samuels
Department of English
Case Western Reserve University
Cleveland, OH 44106
Office: (216)368-2362
368-2340
Home: (216)932-1594

Jack Selzer
Department of English
Penn State University
University Park, PA 16802
Office: (814)865-0251

Dale L. Sullivan
Kansas Technical Institute
Salina, KS 67401
Office: (913)823-3698

Andrea Corcoran Walter
College of Continuing Education
50 W. Main St.
Rochester Institute of Technology
Rochester, NY 14614
Office: (716)262-6288

Thomas L. Warren
Department of English
Morrill Hall 205
Oklahoma State University
Stillwater, OK 74078
Office: (405)624-6218

Victoria M. Winkler
Department of Rhetoric
202 Haecker Hall
University of Minnesota
St. Paul, MN 55108
Office: (612)376-4636

SECRETARY'S MINUTES FOR 1983

The Annual Business Meeting of the Council for Programs in Technical and Scientific Communication was held at the Nebraska Center for Continuing Education at the University of Nebraska in Lincoln, Nebraska, on 8 April 1983, beginning at 9:09 a.m., with the President, Virginia A. Book, presiding.

Old Business

Members chose to dispense with reading the minutes for 1982, which were accepted and approved as presented.

Book read letters of greeting from the Governor of Nebraska, Robert Kerrey, and the Mayor of Lincoln, Helen G. Boosalis.

The Treasurer, Marilyn Schauer Samuels, presented the treasurer's report. The balance in the treasury was $1,974.38, with costs for Proceedings 1982 outstanding. As of March 22, there were 62 members: 39 renewals, plus 23 new members.

Book reported that of the 77 members listed in Proceedings 1982, 1 was a departmental membership, 43 were men, and 33 were women. The members are directors/coordinators of programs and individuals who are interested in developing programs; therefore, the membership remains small.

Members reviewed a list of 27 schools that offer programs and added the following to the list:

Bowling Green State University:	B.A.
Drexel University:	M.S. in Technical and Science Communication
St. Louis Community College:	A.S.
University of Tulsa:	M.A. in Letters with an option in Technical Writing

Members were interested to know if South Dakota State University still has a program.

Individuals from several school have requested information to help them develop new programs and expand existing programs:

La Salle College
Michigan Technological University (Ph.D.)
New York Institute of Technology
San Diego State University
San Francisco State University
State University of New York at Binghamton
University of Colorado at Denver (M.S.)
University of Delaware

A sample layout for a membership brochure was presented by the Secretary, JoAnn T. Hackos. It was moved and seconded to leave the decision on the brochure to the Executive Committee, who should gather information on costs and proceed to print. The motion was passed.

Book reported that Thomas E. Pearsall has agreed to establish archives for the Council. He has been asked to write a brief history of the Council, prepare an index of the proceedings, make the index available to the membership, and seek publication in ERIC.

A motion was made and passed to thank Vice President and Editor, Patrick M. Kelley, and his editorial staff for their fine work on Proceedings 1982. Kelley asked for suggestions for additions to the proceedings for 1983. Book suggested adding a list of the sites and dates of previous meetings and the history that Pearsall has been asked to write.

New Business

Kelley reported on progress toward a revised directory of programs. He proposed putting the text of the revised directory in a computer file so that it can be updated easily by the editors. He also proposed binding the text in a ring binder so that it can be updated easily by the members. The response to both proposals was positive. He asked if members should be charged for the directory. Book suggested that the directory should be included as a benefit of membership. Thomas L. Warren suggested that the Executive Committee consider the possibility of obtaining a small grant to fund the directory. He also suggested placing ads in journals to solicit information about programs. Kelley agreed to begin work on the directory and present members with a model format for information on programs.

Samuels reported on a problem with the collection of dues and recommended a renewal date of 15 April rather than a renewal at the annual meeting. Problems arise because many members are unable to attend the annual meeting. According to the Constitution, Article VII, Finances: "All dues are payable prior to or upon registration at the annual meeting." After a lengthy discussion, the Council recommended that dues be paid by 15 April or by the annual meeting, whichever comes first. (Dates for the annual meeting are selected by the host. They vary, depending on the location of the meeting and other factors.) People who renew or join after the renewal date will receive memberships effective for the next year (January 1); they will not receive the proceedings for the current year.

In response to a motion made at the annual meeting in 1982, the Executive Committee reviewed the procedures for nominating and electing officers. Book reported the Executive Committee's recommendation that the procedures remain as specified in the Constitution, Article VIII, Elections. However, the Executive Committee should contact all nominees prior to the annual meeting to ask their approval to have their names placed on the ballot. Nominators from the floor at the annual meeting also should ask nominees for their approval to have their names placed on the ballot. A motion to accept the Executive Committee's recommendations was passed.

Book presented an offer from Paul V. Anderson to submit the proposal for the master's program at Miami University for publication in the proceedings. The offer was declined--reluctantly--because of concern for establishing a precedent that could result in a significant expansion of the proceedings and an increase in the cost. Because the value of such a document is obvious, Warren suggested that generic proposals could be prepared with an accompanying list of specific proposals available by request. Victoria M. Winkler suggested that a booklet of sample proposals could be prepared. No action was taken on these suggestions at this time.

Book presented another offer from Anderson to host the annual meeting at Miami University in Oxford, Ohio, in 1985. She asked if there were additional offers. Andrea C. Walter offered Rochester Institute of Technology at Rochester, New York. The membership voted to accept the offer of Miami University as the site of the annual meeting in 1985.

In 1984, the annual meeting will be hosted by Kelley in New Mexico. The date of the annual meeting is 23-24 February 1984.

A motion was passed unanimously by the Council to thank Book and the University of Nebraska for their hospitality.

After a motion to adjourn was passed, the meeting concluded at 11:15 a.m.

Respectfully submitted,

JoAnn T. Hackos

JoAnn T. Hackos
Secretary

TREASURER'S REPORT FOR 1982-83

This report on the treasury of the Council for Programs in Technical and Scientific Communication was current as of 20 April 1983.

Credits

Balance brought forward from before meeting in 1982	$1,097.87
Memberships: 52 renewals + 25 new = 77 x $15.00	1,155.00
Interest	93.85
Sales of Proceedings, Directory, etc.	22.04
Return of deposit from Park Schenley	50.00
	2,418.76

Debits

Supplies (letterhead stationery, envelopes; postage; checks)	112.75
Printing 10 copies of T.W. materials	64.66
Photocopying	7.55
Mailing notices for Annual Meeting	18.09
Printing, binding, and distributing Proceedings 1982	684.26
	887.31

Balance	$1,531.45

Respectfully submitted,

Marilyn Schauer Samuels

Marilyn Schauer Samuels
Treasurer

APPENDICES

APPENDIX A: CONSTITUTION

(As Amended 1981)

ARTICLE I
NAME:

The name of the organization shall be Council for Programs in Technical and Scientific Communication.

ARTICLE II
PURPOSE:

The primary purposes of the organization shall be to (1) promote programs in technical and scientific communication, (2) promote research in technical and scientific communication, (3) develop opportunities for the exchange of ideas and information concerning programs, research, and career opportunities, (4) assist in the development of new programs in technical and scientific communication, and (5) promote exchange of information between this organization and interested parties. Said organization is organized exclusively for educational purposes.

ARTICLE III
MEMBERSHIP:

Membership shall be open to any individual or institution interested in supporting the purposes indentified in Article II. Individuals or institutions whose primary responsibilities or functions are education shall be designated *Regular Voting Members*. Others shall be designated *Special Non-Voting Members*. Membership shall be open to any person without regard for race, age, sex, or religious affiliation.

ARTICLE IV
OFFICERS

The officers of the organization shall be president, vice-president, secretary, and treasurer, each to be elected for a two-year term.

The duties of the officers shall be:

President:
1) preside at the annual national convention of the organization.
2) represent the organization at official functions.
3) serve as chairman of the executive committee.

Vice President:
1) perform all the duties of the president in the event of the president's absence.

ARTICLE IV
OFFICERS:
(continued)

Secretary: 1) maintain all records of the organization including matters of correspondence.

Treasurer: 1) handle all financial matters of the organization including the receiving and recording of dues and payments and paying the bills of the organization.
2) maintain an up-to-date membership list.

The president, vice president, secretary, and treasurer, plus the immediate past president and one member-at-large, elected by the membership, shall serve as an executive committee. The executive committee shall have the right to act on the behalf of the organization at such times as the organization is not meeting in full assembly except to change the constitution or carry out elections.

ARTICLE V
LIMITS:

No part of the net earning of the organization shall inure to the benefit of, or be distributable to its members, trustees, officers, or other private persons, except that the organization shall be authorized and empowered to pay reasonable compensation for services rendered and to make payments and distributions in furtherance of the purposes set forth in Article III hereof. No substantial part of the activities of the organization shall be the carrying out of propaganda, or otherwise attempting to influence legislation, and the organization shall not participate in, or intervene in (including the publishing or distribution of statements) any political campaign on behalf of any candidate for public office. Notwithstanding any other provision of these articles, the organization shall not carry on any other activities not permitted to be carried on (a) by a corporation exempt from Federal income tax under section 501 (c) (3) of the Internal Revenue Code of 1954 (or the corresponding provision of any future United States Internal Revenue Law) or (b) by a corporation, contributions to which are deductible under section 170 (e) (2) of the Internal Revenue Code of 1954 (or corresponding provision of any future United States Internal Revenue Law).

ARTICLE VI
MEETINGS:

The organization shall meet in full convention annually. The location of the annual meeting shall be determined by vote of assembly at the preceding convention. The approximate date of the meeting shall also be established.

Special meetings of the organization may be held at need as determined by the executive committee.

ARTICLE VII
FINANCES:

The dues for the organization shall be $15.00 per year for Regular Voting Members and $50.00 for Special Non-Voting Members. All dues are payable prior to or upon registration at the annual meeting.

ARTICLE VIII
ELECTIONS:

The election of officers and members-at-large to the executive committee shall be held at the annual meeting. The existing executive committee shall each year nominate a slate of officers and a member-at-large and have this slate in the hands of the membership 30 days before the annual meeting. Nominations will also be allowed from the floor at the annual meeting. Elections shall be by written ballot.

ARTICLE IX
CONSTITUTIONAL AMENDMENT:

This constitution shall be amendable by a two-thirds vote of the assembly present and voting at the annual meeting. Proposed amendments to the constitution must be in the hands of the members at least two months in advance of the annual meeting at which the vote is to be taken.

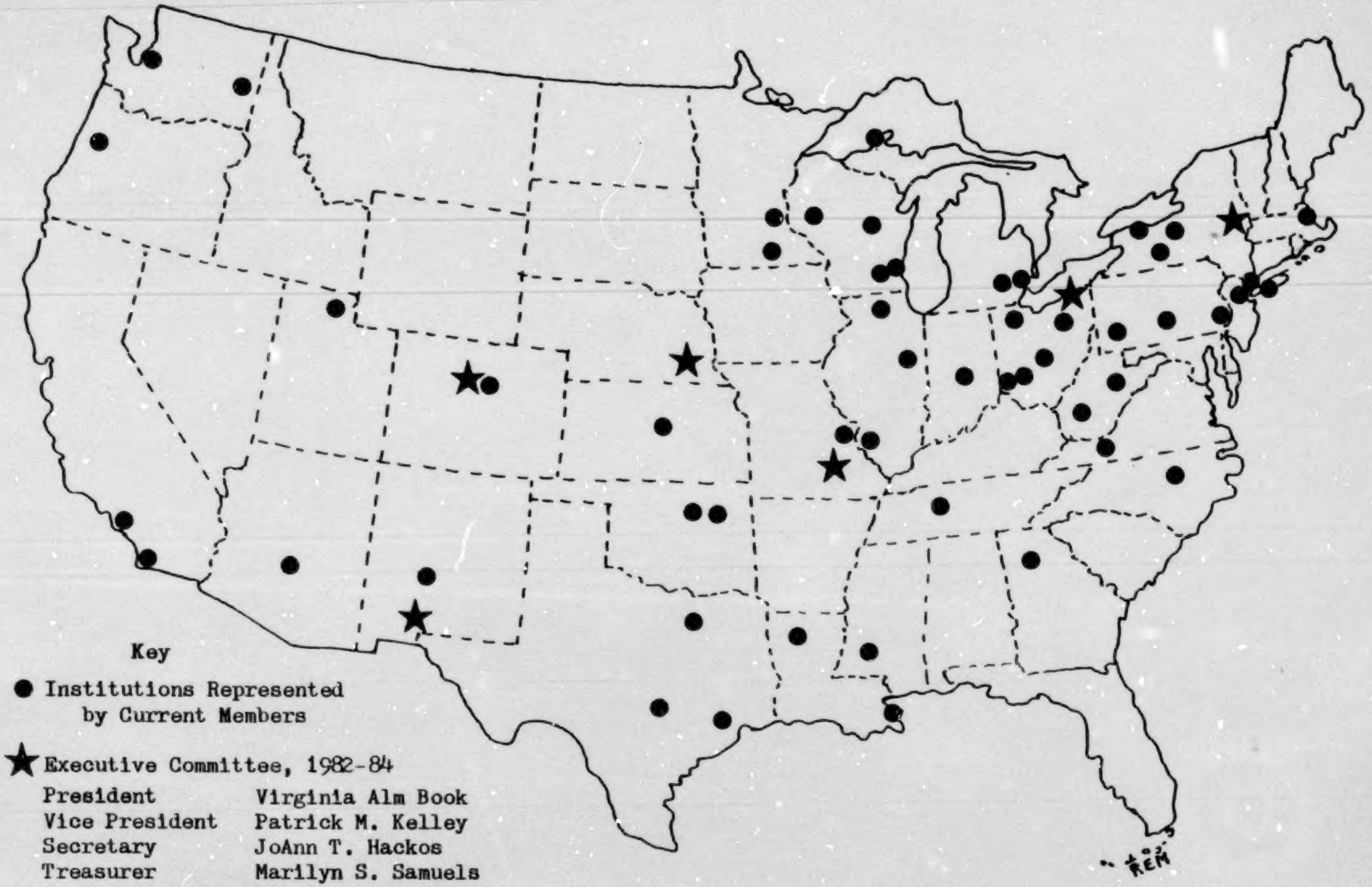
ARTICLE X
DISSOLUTION:

Upon the dissolution of the organization, the Board of Directors shall, after paying or making provision for the payment of all of the liabilities of the organization, dispose of all of the assets of the organization exclusively for the purposes of the organization in such manner, or to such organization or organizations organized and operated exclusively for charitable, educational, religious, or scientific purposes as shall at the time qualify as an exempt organization or organizations under section 501 (c) (3) of the Internal Revenue Code of 1954 (or the corresponding provision of any future United States Internal Revenue Law), as the Board of Directors shall determine. Any such assets not so disposed of shall be disposed of by the Court of

ARTICLE X DISSOLUTION: (continued)	Common Pleas of the county in which the principal office of the corporation is then located, exclusively for such purposes or to such organization or organizations, as said Court shall determine, which are organized and operated for such purposes.
ARTICLE XI PARLIAMENTARY AUTHORITY:	All official meetings of the organization shall be conducted according to the *Standard Code of Parliamentary Procedure* by Alice B. Sturgis. The presiding officer shall appoint a parliamentarian to advise the assembly at each annual meeting.

APPENDIX B: ANNUAL MEETINGS, SITES, AND DATES

1st	University of Minnesota	St. Paul, MN	1974
2nd	Boston University	Boston, MA	1975
3rd	Colorado State University	Fort Collins, CO	1976
4th	University of Minnesota	St. Paul, MN	1977
5th	Rensselaer Polytechnic Institute	Troy, NY	1978
6th	Oklahoma State University	Stillwater, OK	1979
7th	University of Central Florida	Orlando, FL	1980
8th	University of Washington	Seattle, WA	1981
9th	Carnegie-Mellon University	Pittsburgh, PA	1982
10th	University of Nebraska	Lincoln, NE	1983
11th	New Mexico State University	Las Cruces, NM	1984
12th	Miami University	Miami, OH	1985



Key

● Institutions Represented by Current Members

★ Executive Committee, 1982-84

President	Virginia Alm Book
Vice President	Patrick M. Kelley
Secretary	JoAnn T. Hackos
Treasurer	Marilyn S. Samuels
Member-at-Large	Sam C. Geonetta
Past President	David L. Carson

APPENDIX C: EXECUTIVE COMMITTEE AND INSTITUTIONS REPRESENTED BY CURRENT MEMBERS

APPENDIX D: CURRENT MEMBERS

Paul Anderson
Department of English
Miami University
Oxford, OH 45056

Theodore Andra
Department of English
UMN 32
Utah State University
Logan, UT 84322

Marthalee Barton
Department of Humanities
School of Engineering
University of Michigan
Ann Arbor, MI 48109

David Bloomstrand
Division of Communications
Rock Valley College
Rockford, IL 61101

Virginia Alm Book
108 Agricultural Communications
University of Nebraska
Lincoln, NE 68583-0918

Stephen C. Brennan
Dept. of Humanities-Communications
Drexel University
Philadelphia, PA 19104

R. John Brockmann
Division of Technology
College of Engineering
and Applied Sciences
Arizona State University
Tempe, AZ 85281

Charles T. Brusaw
NCR Corporation
Dayton, OH 45479

William D. Bulloch
Publication Center
Bell Telephone Laboratories
101 John F. Kennedy Parkway
Short Hills, NJ 07078

David L. Carson
Dept. of Lang., Lit., and Comm.
Rensselaer Polytechnic Institute
Troy, NY 12181

Laura F. Casari
108 Agricultural Communications
University of Nebraska
Lincoln, NE 68583-0918

William O. Coggin
Department of English
Bowling Green State University
Bowling Green, OH 43402

Mary B. Coney
Program in Scientific and
Technical Communication
University of Washington
Seattle, WA 98195

Elizabeth J. Cooper
University of Houston
1117 Columbia
Houston, TX 77008

Edward P. J. Corbett
Department of English
Ohio State University
164 West 17th Avenue
Columbus, OH 43210-1370

Beekman W. Cottrell
Department of English
Carnegie-Mellon University
Pittsburgh, PA 15213

Helen Cropley
114 Quarter Horse Drive
Scott Depot, WV 25560

William Elliot
Dept. of Humanities-Communications
Drexel University
Philadelphia, PA 19104

Robert C. Eskridge
Career Education
Belleville Area College
2500 Carlyle Road
Belleville, IL 62221

David Farkas
Program in Scientific and
Technical Communication
University of Washington
Seattle, WA 98195

Odaris Farmer
Department of English
West Virginia State College
P.O. Box 42
Institute, WV 25112

Phyllis P. Franklin
English Programs and ADE
Modern Language Association
62 Fifth Avenue
New York, NY 10011

Sam C. Geonetta
Department of Humanities
University of Missouri-Rolla
Rolla, MO 65401

Georgia Institute of Technology
Department of English
Atlanta, GA 30332

James A. Gifford
Department of English
U. of Wisconsin-Stevens Point
Stevens Point, WI 54481

Jone A. Goldstein
3701 Middleton
Ann Arbor, MI 48105

Edward Guiliano
New York Institute of Technology
P.O. Box 170
Old Westbury, NY 11568

JoAnn T. Hackos
Department of English
University of Colorado at Denver
Denver, CO 80202

Laurie S. Hayes
Department of Rhetoric
217 Haecker Hall
University of Minnesota
St. Paul, MN 55108

Julie S. Held
11211 School of Engineering
and Technology
Indiana U.-Purdue U.
Indianapolis, IN 46323

Susan Herrman
Office of the Dean
Purdue U. School of Engineering
and Technology
799 W. Michigan Street
Indianapolis, IN 46323

Jack Jobst
Department of Humanities
Michigan Technological University
Houghton, MI 49931

Simon S. Johnson
Department of English
Oregon State University
Corvallis, OR 97331

Judith Kaufman
Department of English
Eastern Washington University
Cheney, WA 99004

Patrick M. Kelley
Department of English
New Mexico State University
Box 3E
Las Cruces, NM 88003

Betty J. Kenty-Morgan
12941 Abra Drive
San Diego, CA 92128

Carol Lipson
Department of English
Syracuse University
Syracuse, NY 13210

Sherry Little
San Diego State University
2482 Valley Mill Road
El Cajon, CA 92020

Helen M. Loeb
Department of English
Northeastern University
360 Huntington Avenue
Boston, MA 02115

Raymond N. Mackenzie
Department of English
Mankato State University
Mankato, MN 56001

Elizabeth L. Malone
Department of English
Wayne State University
Detroit, MI 48202

Joseph C. Mancuso
Department of English
Auditorium Building 112
North Texas State University
Denton, TX 76203

Roger E. Masse
Department of English
New Mexico State University
Box 3E
Las Cruces, NM 88003

Carolyn R. Miller
Department of English
North Carolina State University
Box 5308
Raleigh, NC 27650

Dennis Minor
Department of English
Louisiana Tech. University
Ruston, LA 71272

Carol Niederlander
St. Louis Community College
at Forest Park
5600 Oakland Avenue
St. Louis, MO 63110

Martha A. Nord
School of Management
Vanderbilt University
Nashville, TN 37235

Thomas E. Pearsall
Department of Rhetoric
University of Minnesota
St. Paul, MN 55108

Nell Ann Pickett
Department of English
Hinds Junior College
Raymond, MS 39154

Diana C. Reep
Department of English
University of Akron
Akron, OH 44325

Joseph A. Rice
College of Technology
University of Houston
Houston, TX 77004

Dan Riordan
Department of English
U. of Wisconsin-Stout
Menomonie, WI 54751

Marilyn Schauer Samuels
Department of English
Case Western Reserve University
Cleveland, OH 44106

Scott Sanders
Department of Humanities
New Mexico Institute of Mining
and Technology
Socorro, NM 87801

Pearl Saunders
St. Louis Community College
at Florissant Valley
3400 Pershall Road
St. Louis, MO 63135

Jack Selzer
Department of English
117 Burrowes Building
Penn State University
University Park, PA 16802

Barbara Smith
Box 2158
Alderson-Broaddus College
Philippi, WV 26416

Morrell Solem
Department of English
U. of Wisconsin-Stout
Menomonie, WI 54751

Paul M. Sorrentino
Department of English
Virginia Polytechnic Institute
and State University
Blacksburg, VA 24061

Sherry G. Southard
Department of English
Morrill Hall 205
Oklahoma State University
Stillwater, OK 74074

James Souther
Loew Hall, FH-10
University of Washington
Seattle, WA 98195

Michael Spitzer
New York Institute of Technology
P.O. Box 170
Old Westbury, NY 11568

Katherine E. Staples
Austin Community College
1403 Possum Trot
Austin, TX 78703

Judith Steininger
Department of General Studies
Milwaukee School of Engineering
P.O. Box 644
Milwaukee, WI 53201-0644

Dale Sullivan
Kansas Technical Institute
Salina, KS 67401

Martha H. Sullivan
Office of the Dean
Newcomb College
Tulane University
New Orleans, LA 70118

Lawson Thompson
Wakesha County Technical Institute
800 Main Street, Rarn B-208
Pewaukee, WI 53072

Elizabeth R. Turpin
1123 Terrace Drive
Bryan, TX 77801

Billie Wahlstrom
Department of Humanities
Michigan Technological University
Houghton, MI 49931

Andrea Corcoran Walter
College of Continuing Education
Rochester Institute of Technology
50 W. Main Street
Rochester, NY 14614

Thomas L. Warren
Department of English
Morrill Hall 205
Oklahoma State University
Stillwater, OK 74074

Richard A. R. Watson
Chapman College
9781 Beverly Lane
Garden Grove, CA 92641

Francis W. Weeks
Department of English
University of Illinois
608 S. Wright Street
Urbana, IL 61801

Merrill Whitburn
Dept. of Lang., Lit., and Comm.
Rensselaer Polytechnic Institute
Troy, NY 12181

Myron L. White
356 Loew Hall, FH-40
University of Washington
Seattle, WA 98195

Antoinette M. Wilkinson
Department of Communication Arts
New York State College
of Ag. and Life Sciences
Roberts Hall
Cornell University
Ithaca, NY 14853

Victoria M. Winkler
Department of Rhetoric
University of Minnesota
St. Paul, MN 55108

Julie Woodruff
Tulsa Junior College
3727 E. Apache
Tulsa, OK 74115

J. O. Yunker
Dept. of Industrial Communication
Metropolitan State College
Box 60
Denver, CO 80204